EMC TESTING REPORT

Applicant:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Product Name:	Base Band Unit
Product Model:	BBU3910

Date of Receipt Test Item:	2017-05-25
Start Date of Test:	2017-05-26
End Date of Test:	2017-05-30

Test Result: Pass

Remark: All tests were conducted and witnessed in Reliability Laboratory of Huawei Technologies Co., Ltd.

Test Engineer :	Xue Haifeng	Sign On File
Report Approved By :	Kidd Yang Senior Peoject Engineer	Digitally signed by Kidd Yang Location: Intertek Testing Services
Date :	12 July 2017	

This summary is part of the full report and should be read in conjunction with it.

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Modification Record

No.	Last Report No.	Modification Description
1	N/A	First report
2	SYBH(E)01613248EA	Update the board version of UPEU and Update the Board list, test configuration and Test Connection, refer to section 3.3, 4.3,4.4
3	SYBH(E)01736015EA	Update the test configuration and Connection, refer to section 4.3,4.4
4	SYBH(E)01878597EA	Add three boards WD22GTMUc/ WD23UMPT/ WD22UCCU and add two test configurations TC5, TC6, refer to section 3.3, 4.3
5	SYBH(E)01906219EA	Add five boards WD23UBBPd9 / WD23UBBPd / WD22UBBPdc / WD22UBBPdd / WD22LMBP and update the Board list, test configurations TC1&TC2&TC4&TC5, refer to section 3.3, 4.3
6	SYBH(E)02178887EA	Add two boards UBBPE / UMPTE and update the Board list, test configuration TC7, refer to section 3.3, 4.3
7	SYBH(E)02360079EA	Add new test configurations TC8-TC9, refer to section 3.3, 4.3
8	SYBH(E)02401168EA	Update the test level and test items of TC2 to satisfy EN50121-4.
9	SYBH(E)02427067EA	Add four boards WD26UBBPd5 / WD26UBBPd6 / WD22UBBPen / WD24UMPTb4 and update the board list, refer to section 3.3, 4.3
10	SYBH(E)02650845EA	Add new board UBBPem and new test configuration TC10, refer to section 3.3, 4.3
11	SYBH(E) 02737379EA	Add two boards WD22LBBPD5 / WD21LCOP and update the board list, refer to section 3.3, 4.3
12	SYBH(E)02910872EA	Add test of radiated immunity from 2.7G-6G, and update the test standards, refer to the section 1.1, 7.2
13	SYBH(E)03025162EA-1	Add five boards MERCa08, MERCa03, MERCa01, MERCa07, UMPTb3, new test configurations TC11-TC14

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1 General Information

1.1 Applied Standard

Applied Product Standard:	EN 55032:2012/AC:2013 CISPR 32:2012 EN 55032:2015 CISPR 32:2015 EN 55024:2010 CISPR 24:2010 EN 55024:2010+A1:2015 CISPR 24:2010+A1:2015 ETSI EN 301 489-1 draft V2.2.0:2017* ETSI EN 301 489-19 draft V2.1.0:2017* ETSI EN 301 489-50 draft V2.2.0:2017* EN 50121-1:2006* EN 50121-4:2015* VCCI-CISPR 32:2016 ICES-003 Issue 6:2016 AS/NZS CISPR 32:2013 IEC 61000-6-1:2005/EN 61000-6-1:2007 IEC 61000-6-2:2005/EN 61000-6-2:2005 IEC 61000-6-3:2006+A1:2010/EN 61000-6-3:2007+A1:2011 IEC 61000-6-4:2006+A1:2010/EN 61000-6-4:2007+A1:2011
Test Methods:	IEC 61000-4-2:2008 IEC 61000-4-3:2010 IEC 61000-4-4:2012 IEC 61000-4-5:2014 IEC 61000-4-6:2013 IEC 61000-4-9:2001 IEC 61000-4-16:1998+A1:2001+A2:2009 IEC 61000-4-29:2000

Note:
1, The standards with * mark have not been accredited by CNAS.
2, Only the test configuration TC2 has been tested according to EN 50121-1, EN 50121-4, IEC 61000-4-9 and IEC 61000-4-16.

1.2 Test Location

Test Location 1:	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	No.2222,Xin Jinqiao Road, Pudong New Area, Shanghai, 201206, P.R.C
Test Location 2:	Shanghai Testing & Inspection Institute for Electrical Equipment
Address:	No.505, Wuning Road, Shanghai, China, 200063
Remark:	Reliability Laboratory of Huawei Technologies Co., Ltd. has been accepted by Intertek as a Level 3 Recognized Satellite Laboratory.(Acceptance Number: L3-CN-15-3002)

1.3 Test Environment Condition

Ambient Temperature:	20–25°C

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Relative Humidity:	45–55%
Atmospheric Pressure:	101kPa

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2 Summary of Test Results

Table 1 Test summary

EUT Classification: Radio Equipment					
Test Items	**Test Configuration**	**Limit or Performance Criteria**		**Test Result**	**Location**
Radiated Emissions Enclosure Port	TC1~TC14	Class B		Pass	Location1
Conducted Emissions ☒DC Power Port ☐AC Power Port ☒Telecommunication Ports	TC1~TC14	Class B		Pass	Location1
Electrostatic Discharge Enclosure Port	TC1~TC14	TT&TR		Pass	Location1
Immunity to Radiated Electromagnetic Fields Enclosure Port	TC1~TC14	CT&CR		Pass	Location1
Immunity to Electrical Fast Transient Bursts ☐Outdoor Signal Port ☒Indoor Signal Port ☐AC Power Port ☒DC Power Port	TC1, TC3~TC14	TT&TR		Pass	Location1
	TC2	CT&CR		Pass	Location1
Immunity to Surges ☐Outdoor Signal Port ☒Indoor Signal Port ☐AC Power Port ☒DC Power Port	TC1~TC14	TT&TR		Pass	Location1
Immunity to Continuous Conducted Interference ☐Outdoor Signal Port ☒Indoor Signal Port ☐AC Power Port ☒DC Power Port	TC1~TC14	CT&CR		Pass	Location1
Immunity to Power Frequency Magnetic Field Enclosure Port	TC1~TC14	CT&CR		NT*	Location1
Immunity to Pulse Magnetic Field Enclosure Port	TC2	TT&TR		Pass	Location1
Immunity to Immunity to Common Mode Conducted Disturbances of 0 Hz to 150 kHz ☒Signal Port ☐AC Power Port ☒DC Power Port	TC2	CT&CR		Pass	Location2
Immunity to Voltage dips and Short Interruption and Voltage Variation DC Power Port	TC1~TC14	CT&CR Refer to 5.3	☐With battery ☒Without battery	Pass	Location1
Note: 1. Measurement taken is within the uncertainty of measurement system. 2. TC is short for test configuration 3. NT is short for not tested. The equipment under test (EUT) has been exempted from immunity tests for power frequency of magnetic fields because the device does not contain any components that are susceptible to magnetic fields. 4. ☒ The item has been tested; ☐ The item has not been tested.					

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3 Equipment Specification

3.1 General Description

The BBU3910 is an indoor baseband unit. It provides physical interfaces for connection with the BSC and RRU. It performs centralized management (OM and Signalling processing) of the entire base station system and provides reference clock for the system.

3.2 Specification

Table 2 Main equipment specification

Rated Input Voltage	⎓ -48 V
Rated Power (W)	1070 W
Dimensions(W x D x H)	442 mm (W) x 310 mm (D) x 86.1 mm (H)
Weight (kg)	≤15kg
Receive frequency	1573 MHz-1577 MHz (GPS)
Frequency of the Internal Source (MHz)	3.84MHz;15.36MHz; 25MHz; 50MHz; 61.44MHz; 122.88 MHz; 125MHz;

Figure 1.EUT appearance

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3.3 Board and Sub-Assembly

Table 3 Board list

Board Name	Hardware Version	Description
WD22USCUB11	VER.D	HERT BBU,WD22USCUB11,Universal Satellite card and Clock Unit type A1(4HP),Without Satellite card,1*1
WD22USCUB12	VER.D	HERT BBU,WD22USCUB12,Universal Satellite card and Clock Unit type A2(4HP),with RT Satellite Card,1*1
WD22USCUB13	VER.D	HERT BBU,WD22USCUB13,Universal Satellite card and Clock Unit type A3(4HP),with RT_SMT Satellite Card,1*1
WD22USCUB14	VER.D	HERT BBU,WD22USCUB14,Universal Satellite card and Clock Unit type A2(4HP),with UBLOX Satellite Card,1*1
WD22USCUB21	VER.D	HERT BBU,WD22USCUB21,Universal Satellite card and Clock Unit type B1(8HP),Without K161 Satellite Card(With Install Accessory),1*1
WD22USCUB22	VER.D	HERT BBU,WD22USCUB22,Universal Satellite card and Clock Unit type B2(8HP),Without Navior-24s Satellite Card(With Install Accessory),1*1
WD22USCUB23	VER.D	HERT BBU,WD22USCUB23,Universal Satellite card and Clock Unit type B2(8HP),Without Navior-24s Satellite Card(With Install Accessory),1*1
WD2M1UEIU	VER.E	Functional Module, HERT BBU,WD2M1UEIU,Universal Environment Interface control Unit
WD22UTRPc	VER.B	Universal Transmission Resource Processing Unit (4 Electrical FE/GE & 2 Optical FE/GE)
WD22UTRPa	VER.A	Manufactured Board,HERT BBU,WD22UTRPa,Universal Extension Transmission Processing Unit type a(8E1/T1)
WD22UBRIb	VER.A	HERT BBU,WD22UBRIb, Universal Base Band Radio Interface Board type B
WD22UMPTb1	VER.B	BBU3910-WD22UMPTb1-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface
WD22UMPTb2	VER.B	BBU3910-WD22UMPTb2-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface, With Ublox Card
WD22UMPTb5	VER.B	BBU3910-WD22UMPTb5-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface, With Ublox Card
WD23UMPTb9	VER.B	BBU3910-WD23UMPTb9-Universal Main Processing & Transmission unit with 2FE/GE interface, With GNSS Card
WD22UBBPd1	VER.B	Manufactured Board,BBU3910,WD22UBBPd1,Baseband Processing and Interface Unit ,1*1
WD22UBBPd2	VER.B	Manufactured Board,BBU3910,WD22UBBPd2,Baseband Processing and Interface Unit ,1*1
WD22UBBPd3	VER.B	Manufactured Board,BBU3910,WD22UBBPd3,Baseband Processing and Interface Unit ,1*1
WD22UBBPd4	VER.B	Manufactured Board,BBU3910,WD22UBBPd4,Baseband Processing and Interface Unit ,1*1
WD22UBBPd5	VER.B	Manufactured Board,BBU3910,WD22UBBPd5,Baseband Processing and Interface Unit ,1*1
WD22UBBPd6	VER.B	Manufactured Board,BBU3910,WD22UBBPd6,Baseband Processing and Interface Unit ,1*1
WD22UBBPd8	VER.B	Manufactured Board,BBU3910,WD22UBBPd8,Baseband Processing and Interface Unit ,1*1

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WD22UBBPd9	VER.B	Manufactured Board,BBU3910,WD22UBBPd9,Baseband Processing and Interface Unit ,1*1
WD22UBBPd9s	VER.B	Manufactured Board,BBU3910,WD22UBBPd9s,Baseband Processing and Interface Unit,1*1
WD22UBBPd1	VER.C	Manufactured Board,BBU3900,WD22UBBPd1,Baseband Processing and Interface Unit ,1*1
WD22UBBPd2	VER.C	Manufactured Board,BBU3900,WD22UBBPd2,Baseband Processing and Interface Unit ,1*1
WD22UBBPd3	VER.C	Manufactured Board,BBU3900,WD22UBBPd3,Baseband Processing and Interface Unit ,1*1
WD22UBBPd4	VER.C	Manufactured Board,BBU3900,WD22UBBPd4,Baseband Processing and Interface Unit ,1*1
WD22UBBPd5	VER.C	Manufactured Board,BBU3900,WD22UBBPd5,Baseband Processing and Interface Unit ,1*1
WD22UBBPd6	VER.C	Manufactured Board,BBU3900,WD22UBBPd6,Baseband Processing and Interface Unit ,1*1
WD22UBBPd8	VER.C	Manufactured Board,BBU3900,WD22UBBPd8,Baseband Processing and Interface Unit ,1*1
WD22UBBPd9	VER.C	Manufactured Board,BBU3900,WD22UBBPd9,Baseband Processing and Interface Unit ,1*1
WD22UBBPd9s	VER.C	Manufactured Board,BBU3900,WD22UBBPd9s,Baseband Processing and Interface Unit,1*1
WD2E1FAND	VER.A	Fan Tray Assembly,HERT BBU,WD2E1FAND,2U Fan Module,FanCfgP32S2328
WD2MUPEUD	03021KBJ VER.C 03022WSP VER.B	HERT BBU WD2MUPEUD -48V Power and Environment interface Unit
WD2MUPEUD2	03021KBJ VER.C 03022WSP VER.B	HERT BBU WD2MUPEUD2 -48V Power and Environment interface Unit
WD23UBBPd1	VER.C	Manufactured Board,BBU3900,WD23UBBPd1,Baseband Processing and Interface Unit ,1*1
WD23UBBPd2	VER.C	Manufactured Board,BBU3900,WD23UBBPd2,Baseband Processing and Interface Unit ,1*1
WD23UBBPd3	VER.C	Manufactured Board,BBU3900,WD23UBBPd3,Baseband Processing and Interface Unit ,1*1
WD23UBBPd4	VER.C	Manufactured Board,BBU3900,WD23UBBPd4,Baseband Processing and Interface Unit ,1*1
WD23UBBPd8	VER.C	Manufactured Board,BBU3900,WD23UBBPd8,Baseband Processing and Interface Unit ,1*1
WD23UBBPd9	VER.C	Manufactured Board,BBU3900,WD23UBBPd9,Baseband Processing and Interface Unit,1*1
WD23UBBPd	VER.D	Manufactured Board,BBU3900,WD23UBBPd,Baseband Processing and Interface Unit,1*1
WD22UBBPda	VER.B	Manufactured Board,BBU3900,WD22UBBPda,Baseband Processing and Interface Unit ,1*1
WD22UBBPdb	VER.B	Manufactured Board,BBU3900,WD22UBBPdb,Baseband Processing and Interface Unit ,1*1

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WD22UBBPdc	VER.B	Manufactured Board,BBU3900,WD22UBBPdc,Baseband Processing and Interface Unit,1*1
WD22UBBPdd	VER.B	Manufactured Board,BBU3900,WD22UBBPdd,Baseband Processing and Interface Unit,1*1
WD22LMBP	VER.C	Manufactured Board,BBU3900,LTE-M,Baseband Processing and Inte rface Unit,1*1
WD2E1FANE	VER.A	Function Module, HERT BBU,WD2E1FANE,2U FAN Module,FanCfg P32S2328
WD22UMPTs	VER.A	BBU3900-WD22UMPTs-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface-With LMA
WD22UMPTs2	VER.A	BBU3900-WD22UMPTs2-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface-With LMA
WD22LBBPD2	VER.D	BBU3900,WD22LBBPD2,LTE Baseband Processing Unit D (3 cell, 4 T4R) ,1*1
WD2MUPEUD	/	HERT BBU WD2MUPEUD -48V Power and Environment interface Unit WD22UEICB(03021KBJ) VER.C WD22UPEF(03021KHJ) VER.C
WD2MUPEUD2	/	HERT BBU WD2MUPEUD2 -48V Power and Environment interface Unit WD22UEICB(03021KBJ) VER.C WD22UPEF(03021KHJ) VER.C
WD22GTMUc	VER.B	BBU3910- WD22GTMUC- GSM transmission and timing and management unit with 4E1 and 2FE/GE interface
WD23UMPT	VER.C	BBU3910-WD23UMPT-Universal Main Processing & Transmission unit with 4E1 and 2FE/GE interface
WD23UMPTb4	VER.C	BBU3910-WD23UMPTb4-Universal Main Processing & Transmission unit with 2FE/GE interface, With Ublox Card
WD22UCCU	VER.A	Manufactured Board,HERT BBU,WD22UCCU,Universal inter-Connection Combo Unit,1*1
WD22UMPTe	VER.B	Universal Main Processing & Transmission unit with 2FE/GE 2FE/GE/XGE and 1CI interface
WD22UMPTe4	VER.B	Universal Main Processing & Transmission unit with 2FE/GE 2FE/GE/XGE and 1CI interface and GNSS Card
WD22UMPTe5	VER.B	Universal Main Processing & Transmission unit with 2FE/GE 2FE/GE/XGE and 1CI interface and BDS Multi Mode Card
WD22UMPTes	VER.B	Universal Main Processing & Transmission unit with 2FE/GE 2FE/GE/XGE and 1CI interface
WD22UMPTe1	VER.B	Universal Main Processing & Transmission unit e1 with 2GE and 2XGE interface
WD22UMPTe2	VER.B	Universal Main Processing & Transmission unit e2 with 2GE and 2XGE interface, With GNSS Card
WD22UMPTe3	VER.B	Universal Main Processing & Transmission unit e3 with 2GE and 2XGE interface, With BDS Multi Mode Card
WD22UBBPe1	VER.A	Manufactured Board,HERT BBU,WD22UBBPe1, Baseband Processing and Interface Unit,1*1
WD22UBBPe2	VER.A	Manufactured Board,HERT BBU,WD22UBBPe2, Baseband Processing and Interface Unit,1*1
WD22UBBPe3	VER.A	Manufactured Board,HERT BBU,WD22UBBPe3, Baseband Processing and Interface Unit,1*1
WD22UBBPe4	VER.A	Manufactured Board,HERT BBU,WD22UBBPe4, Baseband Processing and Interface Unit,1*1

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WD22UBBPe5	VER.A	Manufactured Board, HERT BBU, WD22UBBPe5, Baseband Processing and Interface Unit,1*1
WD22UBBPe6	VER.A	Manufactured Board, HERT BBU, WD22UBBPe6, Baseband Processing and Interface Unit,1*1
WD22UBBPe8	VER.A	Manufactured Board, HERT BBU, WD22UBBPe8, Baseband Processing and Interface Unit,1*1
WD22UBBPe9	VER.A	Manufactured Board, HERT BBU, WD22UBBPe9, Baseband Processing and Interface Unit,1*1
WD22UBBPe9s	VER.A	Manufactured Board, HERT BBU, WD22UBBPe9s, Baseband Processing and Interface Unit,1*1
WD22UBBPea	VER.A	Manufactured Board, HERT BBU, WD22UBBPea, Baseband Processing and Interface Unit,1*1
WD22UBBPeas	VER.A	Manufactured Board, HERT BBU, WD22UBBPeas, Baseband Processing and Interface Unit,1*1
WD21UBBPei	VER.A	Manufactured Board, HERT BBU,WD21UBBPei,Baseband Processing and Interface Unit,1*1
WD21UBBPei2	VER.A	Manufactured Board, HERT BBU,WD21UBBPei2,Baseband Processing and Interface Unit,1*1
WD21UBBPep	VER.A	Manufactured Board, HERT BBU,WD21UBBPep,Baseband Processing and Interface Unit,1*1
WD26UBBPd5	VER.C	Manufactured Board,HERT BBU,WD26UBBPd5,Baseband Processing and Interface Unit,1*1
WD26UBBPd6	VER.D	Manufactured Board,BBU3900,WD26UBBPd6,Baseband Processing and Interface Unit,1*1
WD22UBBPen	VER.C	Finished Board Unit,HERT BBU,WD22UBBPen,Baseband Processing and Interface Unit
WD24UMPTb4	VER.B	Manufactured Board,HERT BBU,WD24UMPTb4,Universal Main Processing & Transmission unit with 2FE/GE interface and GNSS Card,1*1
WD22UBBPem	Ver.A	Manufactured Board,HERT BBU,WD22UBBPem,Baseband Processing and Interface Unit,1*1
WD22LBBPD5	VER.A	Manufactured Board,HERT BBU,WD22LBBPD5,LTE Baseband Processing and Interface Unit D5
WD21LCOP	VER.B	Manufactured Board,HERT BBU,WD21LCOP,LTE Cooperation process board
WD2E2FANE	VER.B	Function Module,HERT BBU,WD2E2FANE,2U FAN Module,FanCfgP32S2328
WD2E3FANE	VER.A	Function Module,HERT BBU,WD2E3FANE,2U FAN Module,FanCfgP32S2328(corrosion-resistant)
WD85MERCa08	VER.A	Manufactured Board,HERT BBU,WD85MERCa08,Multi Extended Radio Frequency Card-6T6R,900M,1*1
WD85MERCa03	VER.A	Manufactured Board,HERT BBU,WD85MERCa03,Multi Extended Radio Frequency Card-6T6R,1800M,1*1
WD85MERCa01	VER.A	Manufactured Board,HERT BBU,WD85MERCa01,Multi Extended Radio Frequency Card-6T6R,2100M,1*1
WD85MERCa07	VER.A	Manufactured Board,HERT BBU,WD85MERCa07,Multi Extended Radio Frequency Card-6T6R,2600M,1*1
WD23UMPTb3	VER.C	BBU3900-WD23UMPTb3-Universal Main Processing & Transmission unit with 2FE/GE interface

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Table 4 Subassembly list

Subassembly			
Subassembly Name	Model	Manufacturer	Description
Subrack	BBU	HUAWEI	shielded

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4 System Configuration during EMC Test

The Equipment under Test (EUT) functions correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical configuration.

4.1 Ports and Cables

Table 5 Port and cables

Port	Quantity	Length (m)	Connector	Type of Cable
DC Power Port	2	2	/	Unshielded
Ethernet port	2	10	RJ45	Shielded (only for maintenance)
FE port	2	10	RJ45	Shielded
GE port	10	2	RJ45	Shielded
E1 port	1	3	DB26	Shielded
FE Port	1	3	SFP	Multi-mode fiber
CPRI	1	3	SFP	Multi-mode fiber
GPS Port	1	10	SMA	Coaxial (Shielded)
Earth	1	3	/	Unshielded
RF Port	6	6	SMA	Coaxial (Shielded)

4.2 Auxiliary Equipment

Table 6 Auxiliary equipment

Name	Model	Manufacturer	S/N	Calibration Date	Cal Interval (month)
Personal Computer	PIII1G/128M/30G/15"	LEGEND	N/A	N/A	N/A
Signal Generator	E4438C	Agilent	3607102318	2017-05-08	12
Signal Generator	E4436B	Agilent	3601044746	2017-05-08	12
Signal Generator	SMU200A	RS	3605020635	2016-10-31	12
Signal Analysis	FSQ8	RS	36090600155	2017-05-08	12

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4.3 Test Configurations

The EUT was connected to auxiliary equipment in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).
There were fourteen test configurations. TC1 to TC14 were shown in the following table and figures:

Table 7 Test configuration

Configuration	Configuration Description
TC1	-48 V DC Supply /full configuration(two UMPT) UBBPd /UMPT DC-I with GPS module
TC2	-48 V DC Supply /full configuration(one UMPT) UBBPd /UMPT DC-I with GPS module
TC3	-48 V DC Supply /full configuration(one UMPT) LBBPd /UMPT DC-I with GPS module
TC4	-48V DC Supply /typical configuration UBBPd /UMPT/UBRIb/UTRP/USCUb DC-I with GPS module
TC5	-48 V DC Supply /full configuration 5 UBBPd /1 GTMUc/1 UMPT DC-I with GPS module
TC6	-48 V DC Supply / G/U/L/GU/GL/UL/GUL typical configuration (UCCU /UMPT) DC-I with GPS module
TC7	-48 V DC Supply / G/U/L/GU/GL/UL/GUL typical configuration (UBBPe/UMPTe) DC-I with GPS module
TC8	-48V DC Supply/G/U/L/GU/GL/UL/GUL typical configuration (UBBPei / UMPTb) DC-I with GPS module
TC9	-48V DC Supply/G/U/L/GU/GL/UL/GUL typical configuration (UBBPep / UMPTb) DC-I with GPS module
TC10	-48V DC Supply/G/U/L/GU/GL/UL/GUL typical configuration (UBBPem / UMPTe) DC-I with GPS module
TC11	-48V DC Supply /MERC 900 MHz, support GSM only, UMTS only, LTE only, GSM/UMTS, GSM/LTE, UMTS/LTE, GSM/UMTS/LTE
TC12	-48V DC Supply /MERC 1800M, support GSM only, UMTS only, LTE only, GSM/UMTS, GSM/LTE, UMTS/LTE, GSM/UMTS/LTE
TC13	-48V DC Supply /MERC 2100M, support GSM only, UMTS only, LTE only, GSM/UMTS, GSM/LTE, UMTS/LTE, GSM/UMTS/LTE
TC14	-48V DC Supply /MERC 2600M, support GSM only, UMTS only, LTE only, GSM/UMTS, GSM/LTE, UMTS/LTE, GSM/UMTS/LTE

<table>
<tr><td rowspan="4">FAN</td><td>UBBPd</td><td>UBBPd</td><td rowspan="2">UPEU</td></tr>
<tr><td>UBBPd</td><td>UBBPd</td></tr>
<tr><td>UBBPd</td><td>UMPT</td><td rowspan="2">UPEU</td></tr>
<tr><td>UBBPd</td><td>UMPT</td></tr>
</table>

Figure 2.Test Configuration1 (TC1)

<table>
<tr><td rowspan="4">FAN</td><td>UBBPd</td><td>UBBPd</td><td rowspan="2">UPEU</td></tr>
<tr><td>UBBPd</td><td>UBBPd</td></tr>
<tr><td>UBBPd</td><td></td><td rowspan="2">UPEU</td></tr>
<tr><td>UBBPd</td><td>UMPT</td></tr>
</table>

Figure 3.Test Configuration2 (TC2)

<table>
<tr><td rowspan="4">FAN</td><td>LBBPd</td><td>LBBPd</td><td rowspan="2">UPEU</td></tr>
<tr><td>LBBPd</td><td>LBBPd</td></tr>
<tr><td>LBBPd</td><td></td><td rowspan="2">UPEU</td></tr>
<tr><td>LBBPd</td><td>UMPT</td></tr>
</table>

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Figure 4.Test Configuration3 (TC3)

Note: UBBPd is WD22UBBPd1 or WD22UBBPd2 or WD22UBBPd3 or WD22UBBPd4 or WD22UBBPd5 or WD22UBBPd6 or WD22UBBPd8 or WD22UBBPd9 or WD22UBBPd9s or WD23UBBPd1 or WD23UBBPd2 or WD23UBBPd3 or WD23UBBPd4 or WD23UBBPd8 or WD22UBBPda or WD22UBBPdb or WD23UBBPd9 or WD23UBBPd or WD22UBBPdc or WD22UBBPdd or WD22LMBP or WD26UBBPd5 or WD26UBBPd6; UMPT is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD22UMPTs or WD22UMPTs2 or WD24UMPTb4;FAN is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE; UPEU is WD2MUPEUD or WD2MUPEUD2 for TC1/TC2.LBBPd is WD22LBBPD2

.

FAN	USCUb	UTRP	UEIU
	UBBPd	UBBPd	
	UBRIb	UMPT	UPEU
	UBBPd	UMPT	

Figure 5.Test Configuration4 (TC4)

Note: UBRIb is WD22UBRIb, USCUb is WD22USCUb11 or WD22USCUb14 or WD22USCUb22 or WD22USCUb23; UBBPd is WD22UBBPd1 or WD22UBBPd2 or WD22UBBPd3 or WD22UBBPd4 or WD22UBBPd5 or WD22UBBPd6 or WD22UBBPd8 or WD22UBBPd9 or WD22UBBPd9s or WD23UBBPd1 or WD23UBBPd2 or WD23UBBPd3 or WD23UBBPd4 or WD23UBBPd8 or WD22UBBPda or WD22UBBPdb or WD23UBBPd9 or WD23UBBPd or WD22UBBPdc or WD22UBBPdd or WD22LMBP or WD26UBBPd5 or WD26UBBPd6; UMPT is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD22UMPTs or WD22UMPTs2 or WD24UMPTb4;UEIU is WD2M1UEIU, FAN is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE; UPEU is WD2MUPEUD or WD2MUPEUD2 for TC4

FANd	UBBPd	UBBPd	UPEUd
	UBBPd	GTMUc	
	UBBPd		UPEUd
	UBBPd	UMPT	

Figure 6.Test Configuration5 (TC5)

Note: UBBPd is WD22UBBPd1 or WD22UBBPd2 or WD22UBBPd3 or WD22UBBPd4 or WD22UBBPd5 or WD22UBBPd6 or WD22UBBPd8 or WD22UBBPd9 or WD22UBBPd9s or WD23UBBPd1 or WD23UBBPd2 or WD23UBBPd3 or WD23UBBPd4 or WD23UBBPd8 or WD22UBBPda or WD22UBBPdb or WD23UBBPd9 or WD23UBBPd or WD22UBBPdc or WD22UBBPdd or WD22LMBP or WD26UBBPd5 or WD26UBBPd6; GTMUc is WD22GTMUC; UMPT is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD22UMPTs or WD22UMPTs2 or WD23UMPTb4 or WD23UMPT or WD24UMPTb4, FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE; UPEUd is WD2MUPEUD or WD2MUPEUD2 for TC5.

FANd	UCCU	UCCU	UPEUd
	UCCU	UCCU	
	UCCU	UMPT	UPEUd
	UCCU	UMPT	

Figure 7.Test Configuration6 (TC6)

Note: Note: UCCU is WD22UCCU; UMPT is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD22UMPTs or WD22UMPTs2 or WD23UMPTb4 or WD23UMPT or WD24UMPTb4; FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE; UPEUd is WD2MUPEUD or WD2MUPEUD2 for TC6.

FANd	UBBPE	UBBPE	UPEUd
	UBBPE	UBBPE	
	UBBPE	UMPTE	UPEUd
	UBBPE	UMPTE	

Figure 8.Test Configuration7 (TC7)

Note: UBBPe is WD22UBBPe1 or WD22UBBPe2 or WD22UBBPe3 or WD22UBBPe4 or WD22UBBPe5 or WD22UBBPe6 or WD22UBBPe8 or WD22UBBPe9 or WD22UBBPe9s or WD22UBBPea or WD22UBBPeas or WD22UBBPen or WD22LBBPD5 or WD21LCOP; UMPTe is WD22UMPTe or WD22UMPTe1 or WD22UMPTe2 or WD22UMPTe3 or WD22UMPTe4 or WD22UMPTe5 or WD22UMPTes; UPEUd is WD2MUPEUD2 or WD2MUPEUD; FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE.

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FANd	UBBPei	UBBPei	UPEUd
	UBBPei	UBBPei	
	UBBPei		UPEUd
	UBBPei	UMPTb	

Figure 9.Test Configuration8 (TC8)

Note: UBBPei is WD21UBBPei or WD21UBBPei2, UMPTb is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD23UMPTb4 or WD24UMPTb4; UPEUd is WD2MUPEUD2 or WD2MUPEUD; FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE.

FANd	UBBPep	UBBPep	UPEUd
	UBBPep	UBBPep	
	UBBPep		UPEUd
	UBBPep	UMPTb	

Figure 10. Test Configuration9 (TC9)

Note: UBBPep is WD21UBBPep, UMPTb is WD22UMPTb1 or WD22UMPTb2 or WD22UMPTb5 or WD23UMPTb9 or WD23UMPTb4 or WD24UMPTb4; UPEUd is WD2MUPEUD2 or WD2MUPEUD; FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE.

FANe	UBBPem	UBBPem	UPEUd
	UBBPem	UBBPem	
	UBBPem	UMPTe	UPEUd
	UBBPem	UMPTe	

Figure 11. Test Configuration10 (TC10)

Note: UBBPem is WD22UBBPem; UMPTe is WD22UMPTe or WD22UMPTe1 or WD22UMPTe2 or WD22UMPTe3 or WD22UMPTe4 or WD22UMPTe5 or WD22UMPTes; UPEUd is WD2MUPEUD2 or WD2MUPEUD; FANd is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE.

FANe	MERCa08	MERCa07	UPEUd
	MERCa03	MERCa01	
	UBBPd	UMPTe	UPEUd
	UBBPd	UMPTe	

Figure 12. Test Configuration11 (TC11)

FANe	MERCa08	MERCa07	UPEUd
	MERCa03	MERCa01	
	UBBPd	UMPTb	UPEUd
	UBBPd	UMPTb	

Figure 13. Test Configuration12 (TC12)

FANe	MERCa08	MERCa07	UPEUd
	MERCa03	MERCa01	
	UBBPe	UMPTe	UPEUd
	UBBPe	UMPTe	

Figure 14. Test Configuration13 (TC13)

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FANe	MERCa08	MERCa07	UPEUd
	MERCa03	MERCa01	
	UBBPe	UMPTe	UPEUd
	UBBPe	UMPTe	

Figure 15. Test Configuration14 (TC14)

Note: UBBPe is WD22UBBPe1 or WD22UBBPe2 or WD22UBBPe3 or WD22UBBPe4 or WD22UBBPe5 or WD22UBBPe6 or WD22UBBPe8 or WD22UBBPe9; UMPTe is WD22UMPTe1 or WD22UMPTe2 or WD22UMPTe3 or WD22UMPTe5; UBBPd is WD22UBBPd1 or WD22UBBPd2 or WD22UBBPd3 or WD22UBBPd4 or WD22UBBPd5 or WD22UBBPd6 or WD22UBBPd8 or WD22UBBPd9; UMPTb is WD22UMPTb1 or WD22UMPTb2 or WD23UMPTb3 or WD24UMPTb4 or WD23UMPTb9;MERCa08 is WD85MERCa08; MERCa03 is WD85MERCa03; MERCa07 is WD85MERCa07; MERCa01 is WD85MERCa01;UPEUd is WD2MUPEUD2; FANe is WD2E1FAND or WD2E1FANE or WD2E2FANE or WD2E3FANE

4.4 Test Condition and Connection

4.4.1 Test Condition

The PC computer controls and monitors the BBU3910 work. The GPS antenna is connected to the BBU3910 with the Coaxial Cable. The CPRI is loopback with fiber.

4.4.2 Test Connection

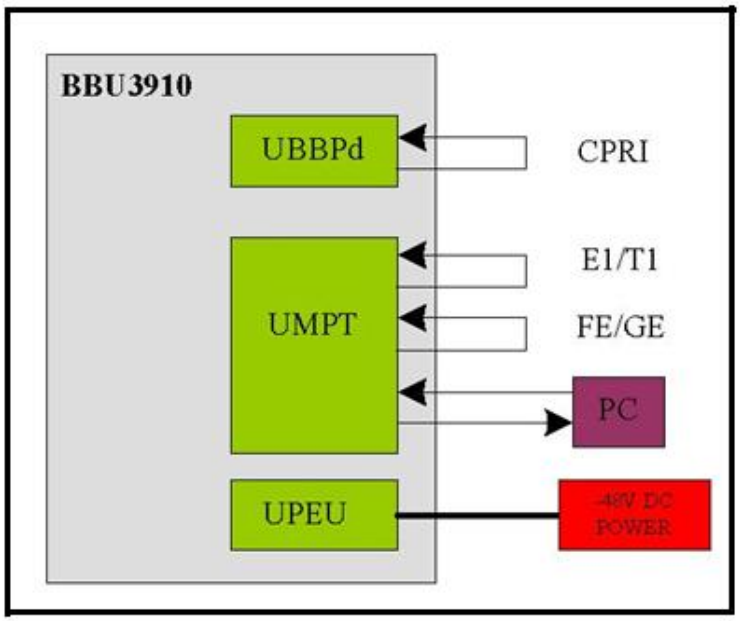

Figure 16. Test connection for TC1/TC2

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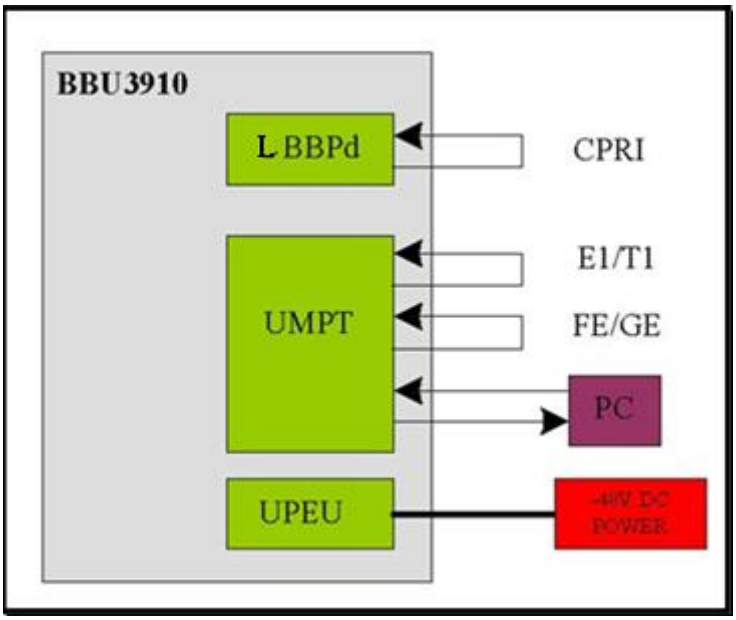

Figure 17. Test connection for TC3

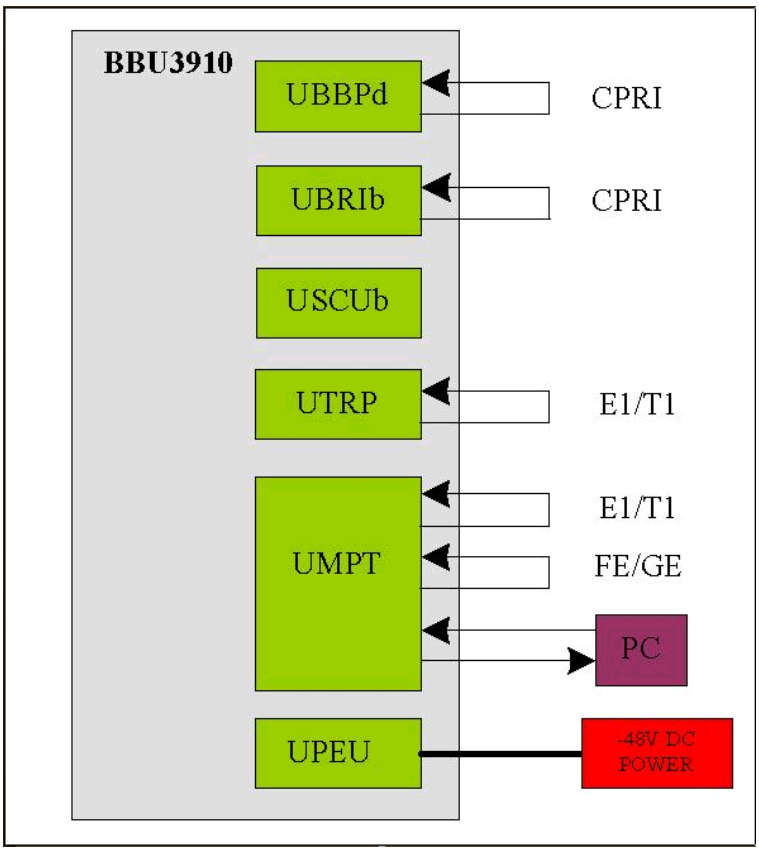

Figure 18. Test connection for TC4

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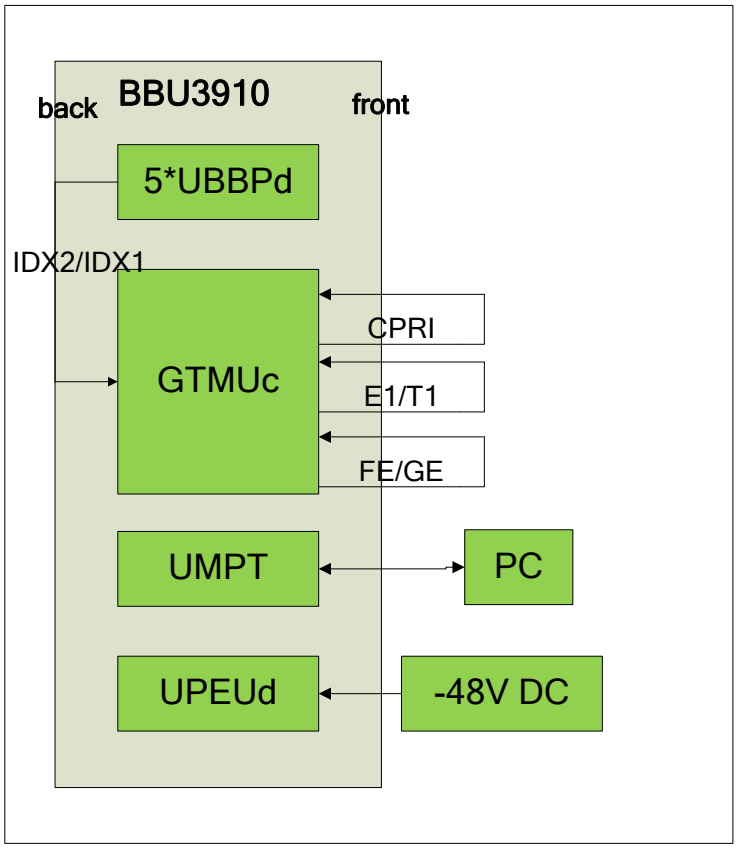

Figure 19. Test connection for TC5

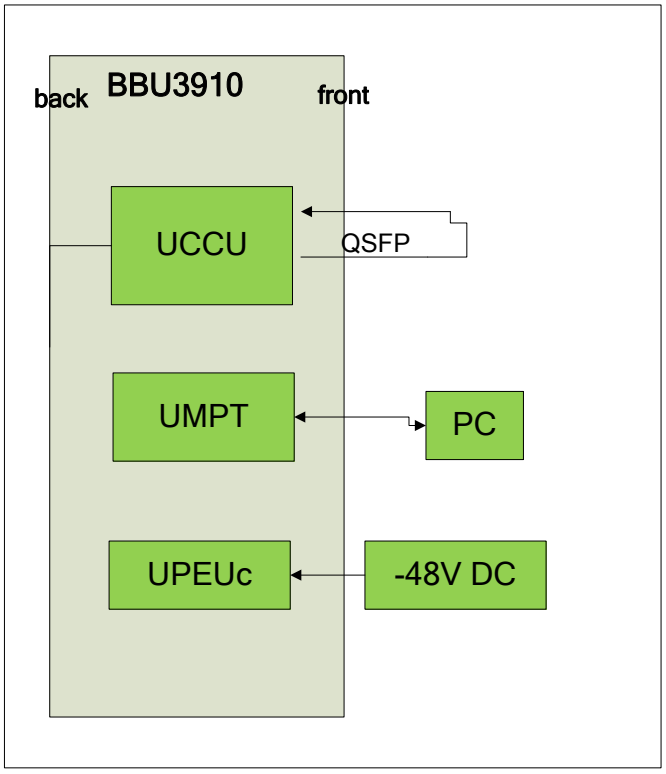

Figure 20. Test connection for TC6

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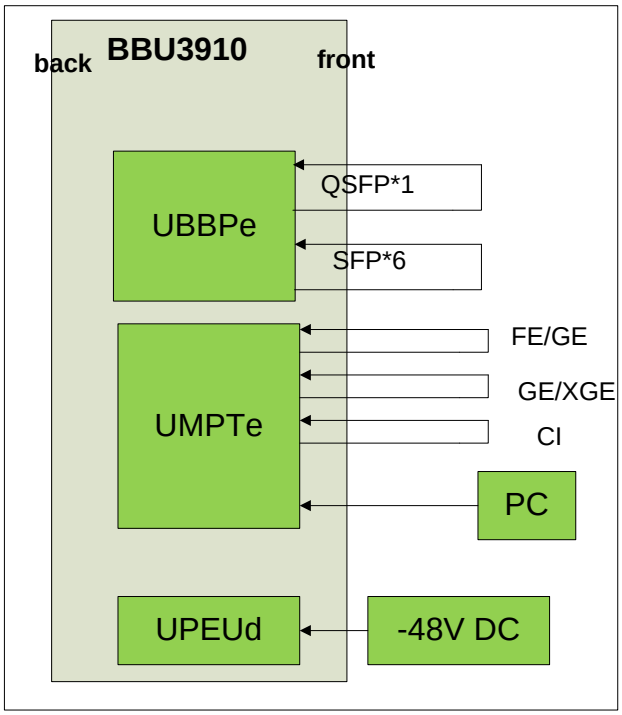

Figure 21. Test connection for TC7

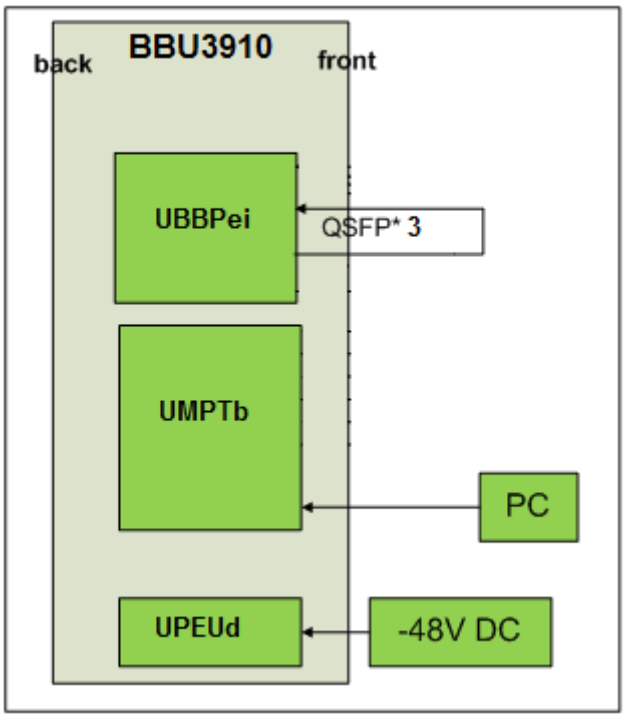

Figure 22. Test connection for TC8

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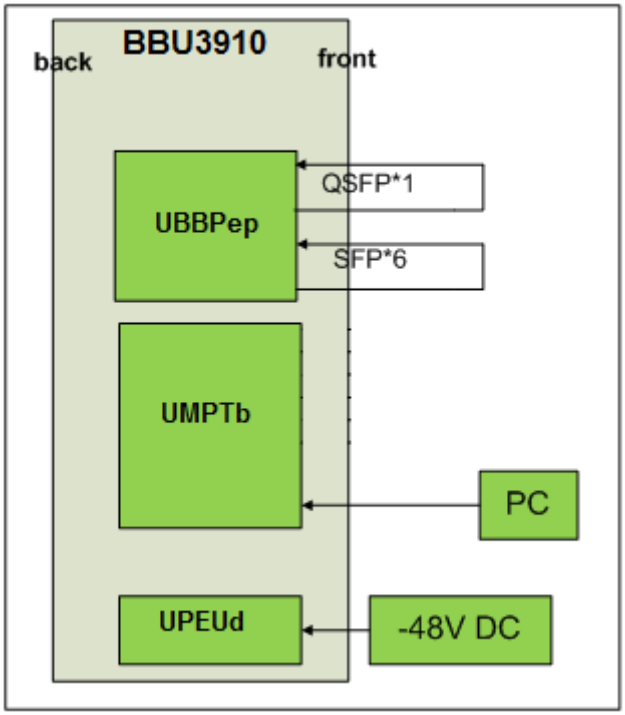

Figure 23. Test connection for TC9

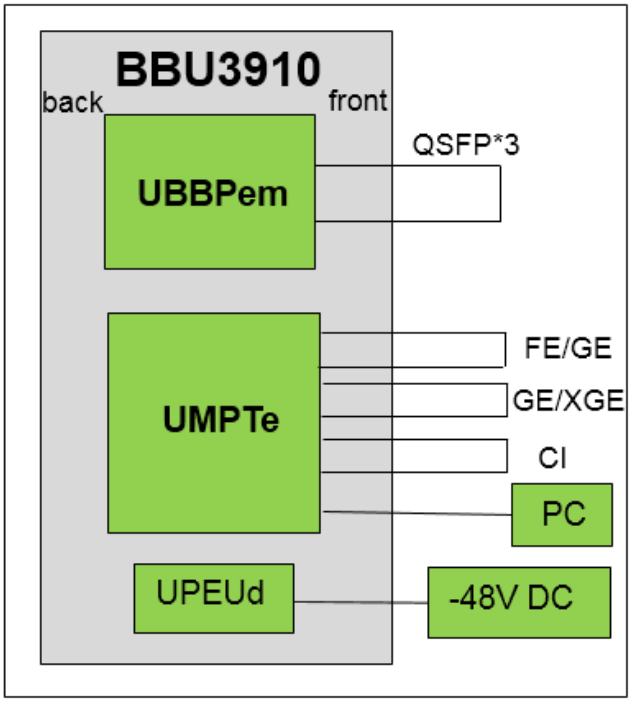

Figure 24. Test connection for TC10

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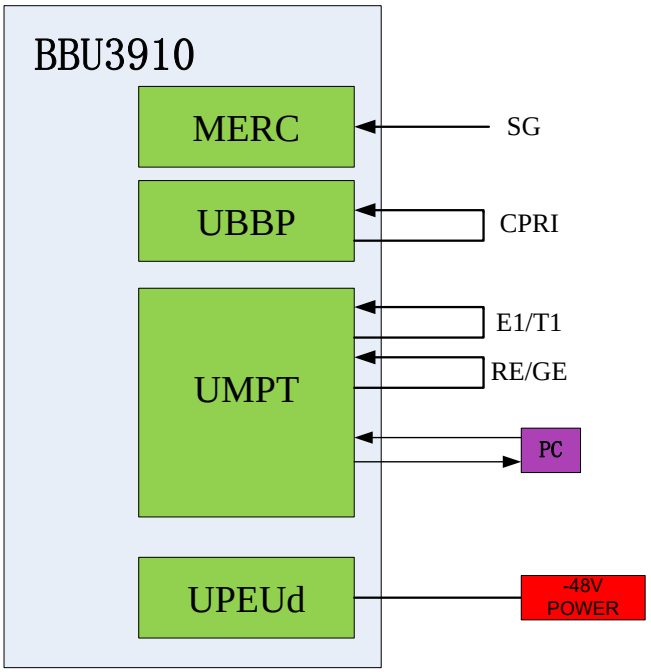

Figure 25. Test connection for TC11~TC14

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5 Immunity Performance Criteria

During immunity test, the EUT is to be monitored for compliance against the performance “CT&CR, TT&TR” criteria as appropriate for the particular test applied. The "pass/fail" performance criterion to be used during test is detailed below:

5.1 Performance Criterion CT&CR (Continuous Phenomena)

A communication link shall be established at the start of the test, and maintained during the test, the RXQUAL of the downlink shall not exceed the value of 3, measured during each individual exposure in the test sequence.

5.2 Performance Criterion TT&TR (Transient Phenomena)

A communications link shall be established at the start of the test.
At the conclusion of each exposure it shall be verified that the communications link has been maintained. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communications link shall have been maintained.

5.3 Performance Criterion DC Voltage dips and interruptions

For a DC voltage dip and interruption test, the following performance criteria apply:
In the case where the equipment is powered solely from the DC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator; no unintentional responses shall occur at the end of the test.

For a Voltage variations corresponding to 80% variation level for the following performance criteria apply: the performance criteria for continuous phenomena CT&CR shall apply.

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6 Electromagnetic Interference (EMI)

6.1 Radiated Emission 30 MHz to 6 GHz

6.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB in accordance with the standard CISPR 16-1-4. The test distance was 3 m for 30 MHz to 1 GHz.
The test site full-anechoic chamber has met the requirement of S_{VSWR} tolerance 6 dB in accordance with the standard CISPR 16-1-4. The test distance was 3 m for 1 GHz to 6 GHz.
The set-up and test methods were in accordance with EN 55032/CISPR 32 standards

A preliminary scan and a final scan of the emissions were made from 30 MHz to 6 GHz by using test software script; the emissions were measured using Quasi-Peak Detector (30 MHz-1 GHz) and Average /Peak Detector (above 1 GHz). The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software set-up. Normally, the antenna height ranged from 1 m to 4 m, and the turntable azimuth ranged from 0°to 360°, The receive antenna has two polarizations: Vertical and Horizontal.

The test set-up diagram is shown as below:

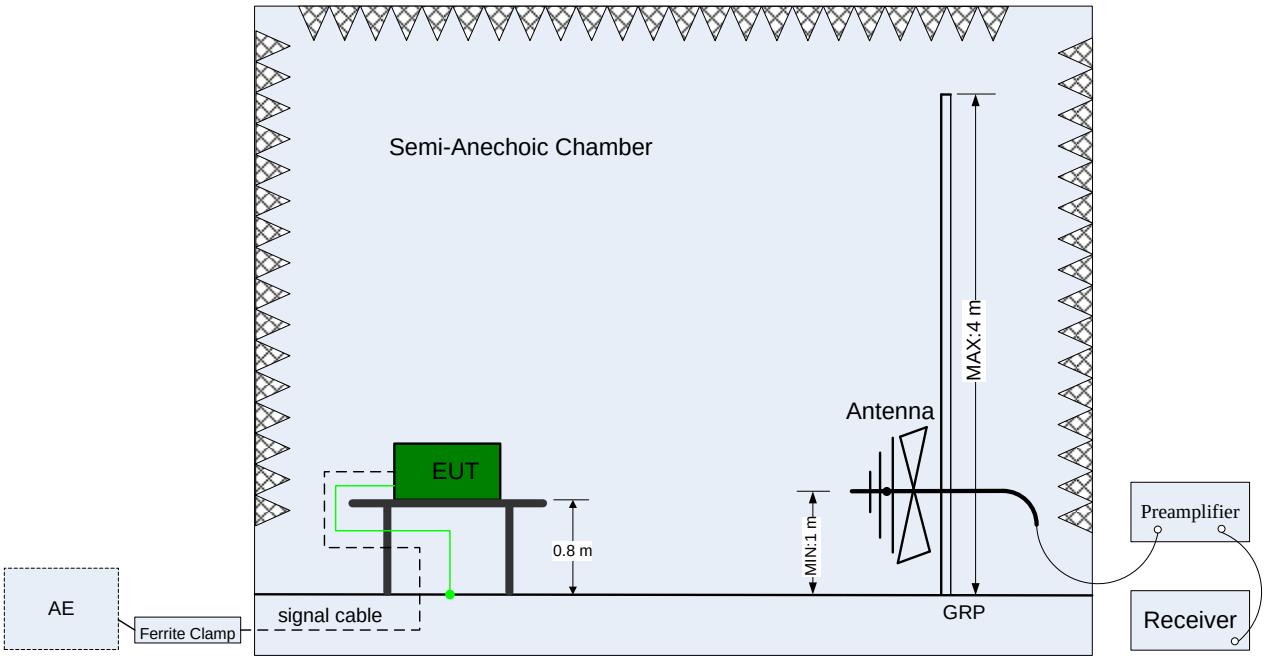

Figure 27. Test set-up of radiated disturbance (30MHz-1GHz)

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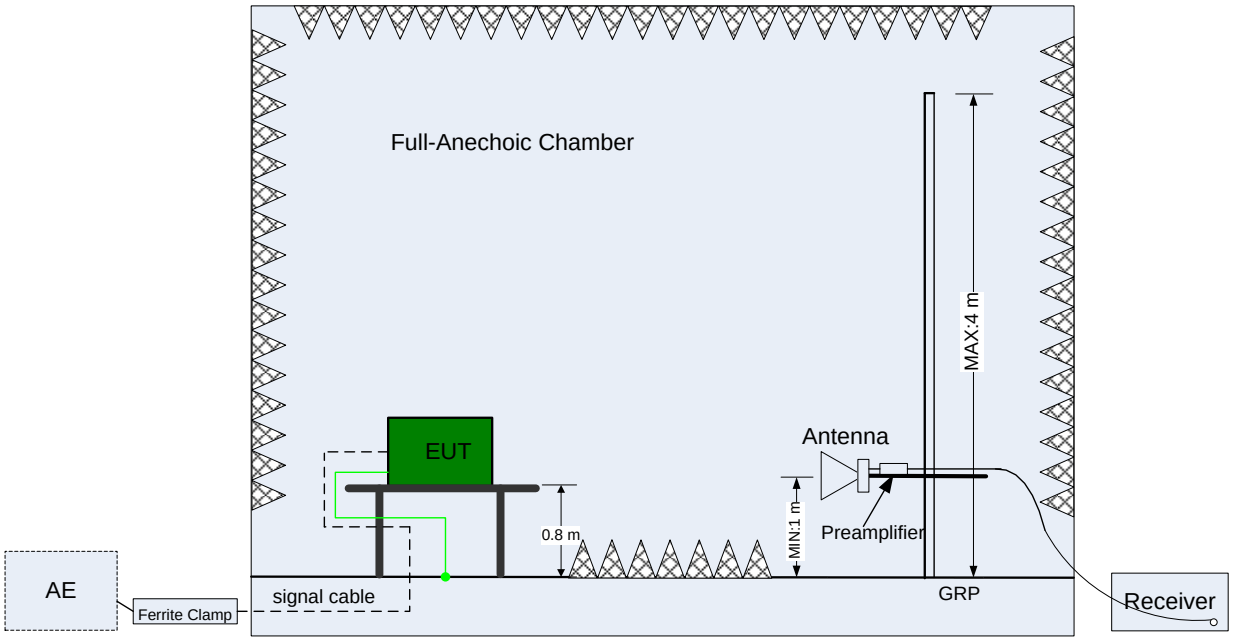

Figure 28. Test set-up of radiated disturbance (above 1GHz)

6.1.2 Test Results

The EUT has met the requirements for radiated emission of enclosure port.
For the test data, see section 10.1.

Table 8 Test limits of 30 MHz to 1 GHz at a measuring distance of 3m

Frequency range	30 MHz to 1 GHz
Measuring distance	3 m
Classification	Class B
Limits(Class B)	30 MHz to 230 MHz 40 dBµV/m 230 MHz to 1 GHz 47 dBµV/m

Table 9 Test limits of 1GHz to 6GHz at a measuring distance of 3m

Frequency range	1 GHz to 6 GHz	
Measuring distance	3 m	
Classification	Class B	
Limits(Class B)	AV	PK
1GHz to 3 GHz	50 dBµV/m	70 dBµV/m
3 GHz to 6 GHz	54 dBµV/m	74 dBµV/m

Note: The highest frequency of the internal sources of the EUT is 125 MHz, the measurement was made up to 6GHz.

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6.2 Conducted Disturbance 0.15 MHz to 30 MHz

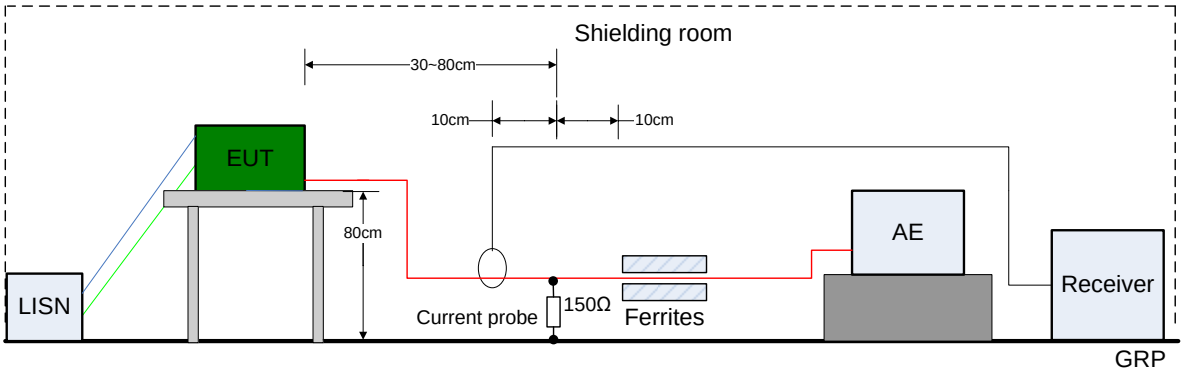
6.2.1 Test Procedure

The EUT was configured as described in section 4 for this test. The mains cable of the EUT must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the LISN.

All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

The set-up of Conducted Disturbance for power port and telecommunication port were in accordance with EN 55032/CISPR 32 standards. The test set-up diagram is shown as below:



Note: The 150 Ω resistance was connected to the outside surface of the shield.

Figure 29. Test set-up of conducted disturbance for telecommunication port (shielded cable)

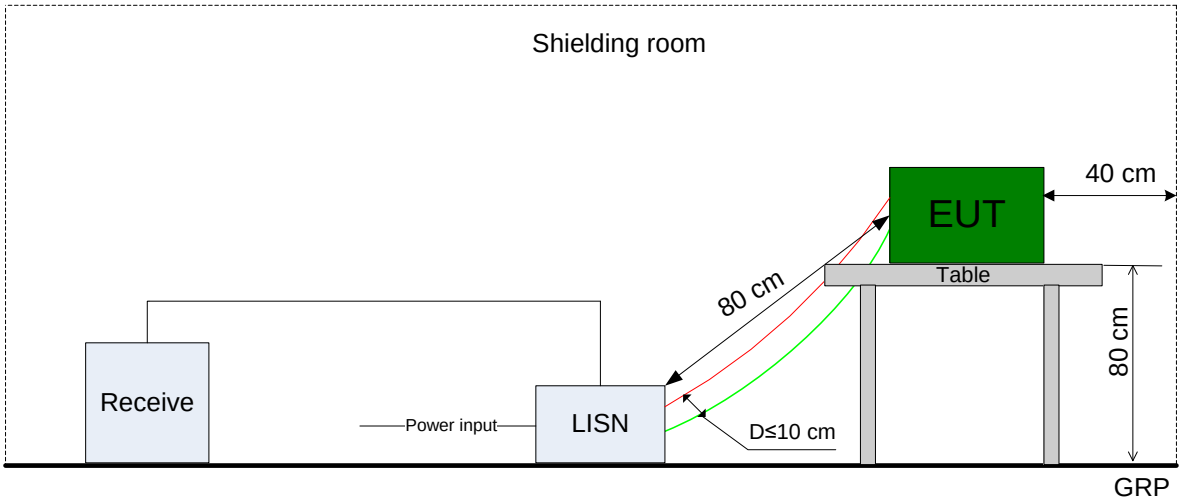


Figure 30. Test set-up of conducted disturbance for power port

6.2.2 Test Results

The EUT has met requirements for Conducted disturbance.

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For the test data, see section 10.3.

Table 10 Limits of telecommunication ports

Frequency Range	150 kHz to 30 MHz			
Port	E1, FE, GE			
Classification	Class B			
Limits (Class B)	Voltage limits (dBµV)		Current limits (dBµA)	
	QP	AV	QP	AV
0.15 MHz to 0.5 MHz	84 to 74	74 to 64	40 to 30	30 to 20
0.5 MHz to 30 MHz	74	64	30	20

Table 11 Limits of DC power port

Frequency Range	150 kHz to 30 MHz	
Classification	Class B	
Limit (Class B)	Voltage limits (dBµV)	
	QP	AV
0.15 MHz to 0.5 MHz	66 to 56	56 to 46
0.5 MHz to 5 MHz	56	46
5 MHz to 30 MHz	60	50

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7 Electromagnetic Susceptibility (EMS)

7.1 Electrostatic Discharge

7.1.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were in accordance with IEC 61000-4-2 standard.
The test environment condition was recorded in the following table:

Table 12 Test environment condition during ESD test

Ambient temperature	25°C
Relative humidity	50%
Atmospheric pressure	101kPa

The test set-up diagram is shown as below:

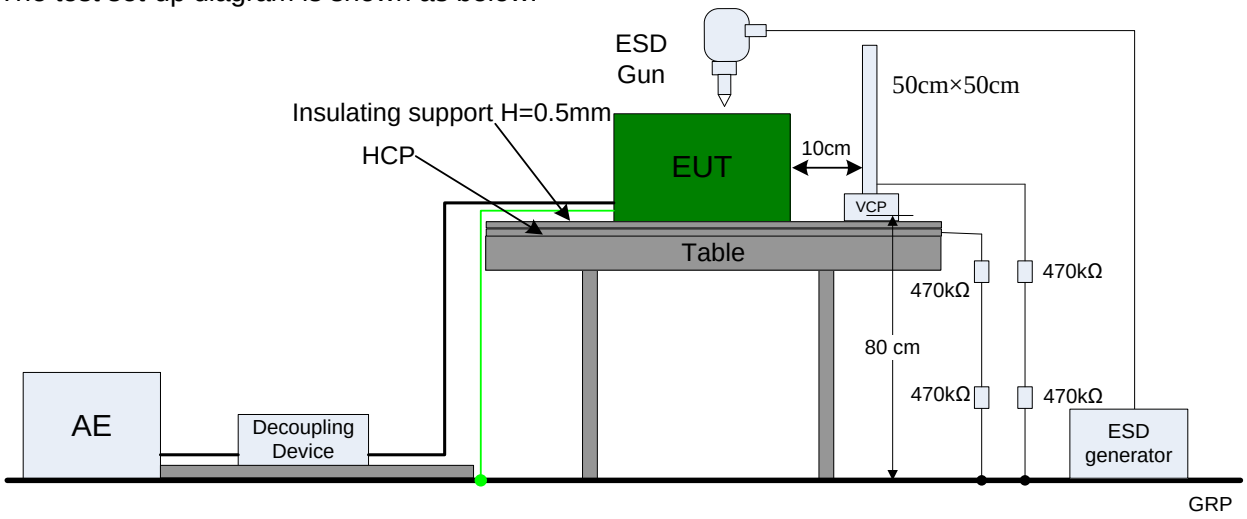

Figure 31. Test set-up of electrostatic discharge

7.1.2 Test Results

The EUT has met the requirements of Performance Criterion TT&TR defined in section 5.
All of the discharge points were presented in the table below, each discharge point was tested for 20 times (10 times for positive and negative), the minimum discharge interval was 1 second.

Table 13 Test results

Test Points	Specification Level				Conclusion
	±2 kV,±4 kV, ±6 kV, ±8 kV Contact Discharges		±2 kV,±4 kV, ±8 kV, ±15 kV Air Discharges		
	Positive	Negative	Positive	Negative	
Horizontal coupling plane-front	√	√	N/A	N/A	Pass
Horizontal coupling plane-rear	√	√	N/A	N/A	Pass
Horizontal coupling plane-left	√	√	N/A	N/A	Pass
Horizontal coupling plane-right	√	√	N/A	N/A	Pass
Vertical coupling plane-front	√	√	N/A	N/A	Pass
Vertical coupling plane-rear	√	√	N/A	N/A	Pass
Vertical coupling plane-left	√	√	N/A	N/A	Pass
Vertical coupling plane-right	√	√	N/A	N/A	Pass

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Connectors	√	√	N/A	N/A	Pass
Screw of frames	√	√	N/A	N/A	Pass
Board panels	√	√	N/A	N/A	Pass
Board gap	N/A	N/A	√	√	Pass
Radiator hole	N/A	N/A	√	√	Pass
Indication lamp	N/A	N/A	√	√	Pass

Note:
"√" The EUT's performance was not impaired at this test point when the electrostatic discharge (ESD) pulse was applied.

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7.2 Immunity to Radiated Electric Fields 80 MHz to 6000 MHz

7.2.1 Test Procedure

The EUT was configured as described in section 4. The set-up and test methods were in accordance with IEC 61000-4-3 standard. All sides of the EUT (front, rear, left and right) were tested using an antenna with vertical and horizontal polarization.
The test set-up diagram is shown as below:

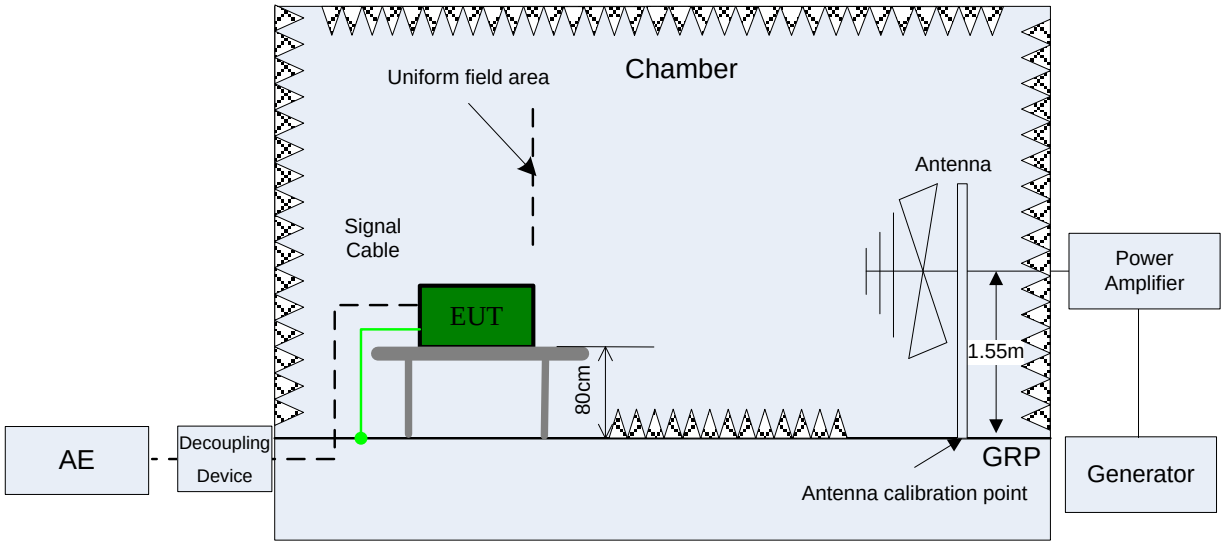

Figure 32. Test set-up of immunity to radiated electric fields

7.2.2 Test Results

The EUT has met the requirements of Performance Criterion CT&CR defined in section 5 for Immunity to Radiated Electric Fields of enclosure port.

Table 14 Test results for TC1 – TC14

Test Side of EUT	Front, Rear, Left, Right
Frequency Range & Test Level	80 MHz to 1000 MHz test level: 10 V/m (Unmodulated, rms) 1000 MHz to 6000 MHz test level: 10 V/m (Unmodulated, rms)
Modulation Method	80% Amplitude modulation at 1kHz sine wave
Swept-Frequency Dwell Time:	1 second
Maximum Step Size:	1%
Special Frequency Points	80 MHz, 120 MHz, 160 MHz; 230 MHz; 434 MHz; 450 MHz;460 MHz; 600 MHz; 850 MHz; 863 MHz and 900 MHz; 1750MHz; 1800 MHz;1950MHz; 2100 MHz and 2400 MHz (±1%).122.88 MHz; 125 MHz
Special Frequencies Dwell Time:	60 seconds
Criterion	CT&CR
Conclusion	Pass

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Table 15 Test results for TC2

Test Side of EUT	Front, Rear, Left, Right
Frequency Range & Test Level	800 MHz to 1000 MHz test level: 20 V/m (Unmodulated, rms)
Modulation Method	80% Amplitude modulation at 1kHz sine wave
Swept-Frequency Dwell Time:	1 second
Maximum Step Size:	1%
Special Frequency Points	850 MHz; 863 MHz and 900 MHz;
Special Frequencies Dwell Time:	60 seconds
Criterion	CT&CR
Conclusion	Pass

Table 16 Test results for TC2

Test Side of EUT	Front, Rear, Left, Right
Frequency Range & Test Level	382 MHz to 385 MHz 392 MHz to 395 MHz test level: 30 V/m (Unmodulated, rms)
Modulation Method	PM, 200Hz, 50% duty cycle
Swept-Frequency Dwell Time:	1 second
Maximum Step Size:	100kHz
Special Frequency Points	None
Special Frequencies Dwell Time:	None
Criterion	CT&CR
Conclusion	Pass

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7.3 Immunity to Electrical Fast Transient Bursts

7.3.1 Test Procedure

The EUT was configured as described in section 4. A series of fast transient bursts meeting the specification were applied for a period of 120 seconds. The transient bursts were applied for both Positive and Negative Burst Trains to each type of signal port and power Port. The set-up and test methods were in accordance with IEC 61000-4-4 standard.

Table 17 Parameter of single pulse and fast transient /burst

Rise Time of Single Pulse (Tr):	5 ns
Duration of Single Pulse (Th):	50 ns
Pulse Repetition Rate:	5 kHz
Burst Duration :	15 ms
Burst Period:	300 ms

The test set-up diagram is shown as below:

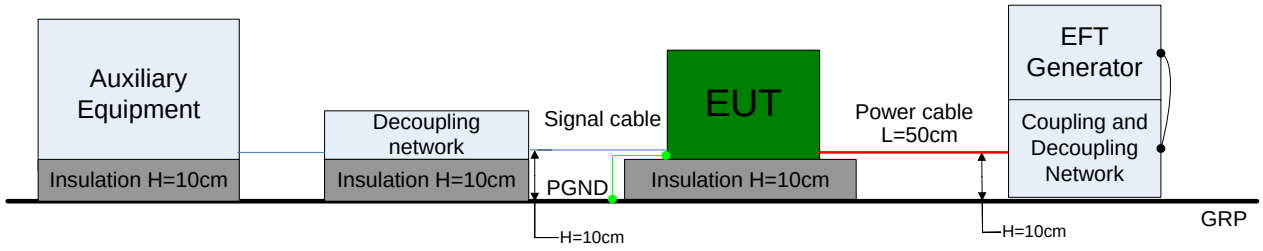

Figure 33. Test set-up of electrical fast transient bursts for power port

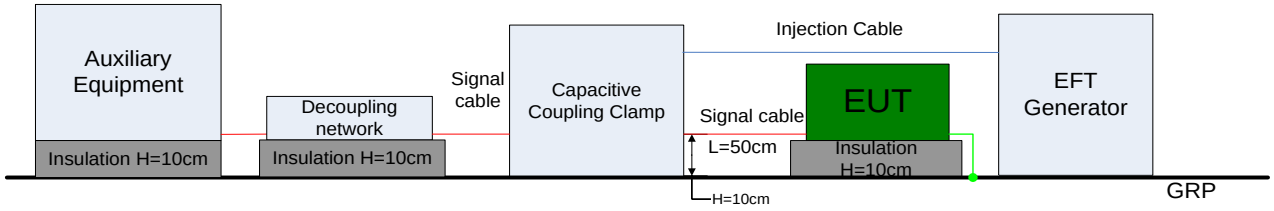

Figure 34. Test set-up of electrical fast transient bursts for signal ports

7.3.2 Test Results

The EUT has met the requirements of Performance Criterion TT&TR, CT&CR defined in section 5.

Table 18 Test results of signal ports for TC1, TC3 – TC14

Ports		Measuring condition	Criterion	Description	Conclusion
Indoor Signal Ports	E1	Common mode coupling Level: ±1 kV, Duration: 2 minutes	TT&TR	No failure detected	Pass
	FE	Common mode coupling Level: ±1 kV, Duration: 2 minutes	TT&TR	No failure detected	Pass
	GE	Common mode coupling Level: ±1 kV, Duration: 2 minutes	TT&TR	No failure detected	Pass

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Table 19 Test results of signal ports for TC2

Ports		Measuring condition	Criterion	Description	Conclusion
Indoor Signal Ports	E1	Common mode coupling Level: ±2 kV, Duration: 2 minutes	CT&CR	No failure detected	Pass
	FE	Common mode coupling Level: ±2 kV, Duration: 2 minutes	CT&CR	No failure detected	Pass
	GE	Common mode coupling Level: ±2 kV, Duration: 2 minutes	CT&CR	No failure detected	Pass

Table 20 Test results of DC power port for TC1, TC3 – TC14

Ports	Measuring condition	Couple mode	Criterion	Description	Conclusion
DC Power Port	Common mode coupling Level: ±1 kV/2 kV, Duration: 2 minutes	-48V RTN PE -48V+RTN RTN+PE -48V+PE -48V+RTN+PE	TT&TR	No failure detected	Pass

Note: RTN=RETURN LEAD

Table 21 Test results of DC power port for TC2

Ports	Measuring condition	Couple mode	Criterion	Description	Conclusion
DC Power Port	Common mode coupling Level: ±1 kV/2 kV, Duration: 2 minutes	-48V RTN PE -48V+RTN RTN+PE -48V+PE -48V+RTN+PE	CT&CR	No failure detected	Pass

Note: RTN=RETURN LEAD

Table 22 Test results of earth port for TC1, TC3 – TC14

Ports	Measuring condition	Couple mode	Criterion	Description	Conclusion
Earth Port	Common mode coupling Level: ±2 kV, Duration: 2 minutes	PE	TT&TR	No failure detected	Pass

Table 23 Test results of earth port for TC2

Ports	Measuring condition	Couple mode	Criterion	Description	Conclusion
Earth Port	Common mode coupling Level: ±2 kV, Duration: 2 minutes	PE	CT&CR	No failure detected	Pass

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7.4 Immunity to Surges

7.4.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were in accordance with IEC 61000-4-5 standard.

The test set-up diagram is shown as below:

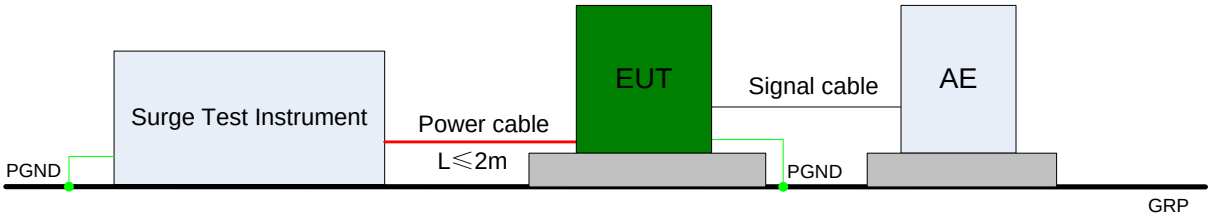

Figure 35. Test set-up of immunity to surge for power port

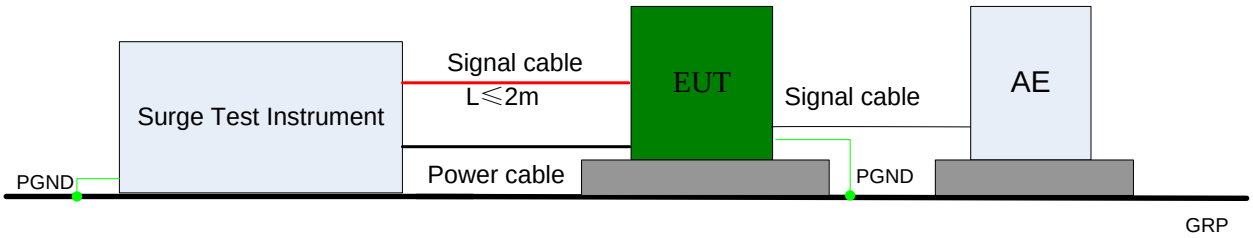

Figure 36. Test set-up of immunity to surge for signal Port

7.4.2 Test Results

The EUT has met the requirements of Performance Criterion TT&TR defined in section 5.

Table 24 Test results of signal ports

Ports		Measuring condition	Description	Conclusion
Indoor Signal Ports	E1	Line to ground Level: ±2 kV, repeat 5 times each Polarity Tr/Th:1.2/50 μs Interval: 60 seconds Line to Line Level: ±1 kV, repeat 5 times each Polarity Tr/Th:1.2/50 μs Interval: 60 seconds	No failure detected	Pass
Indoor Signal Ports	FE	Line to ground Level: ±2 kV, repeat 5 times each Polarity Tr/Th:1.2/50 μs Interval: 60 seconds	No failure detected	Pass
	GE		No failure detected	Pass

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Table 25 Test results of DC power port

Ports	Measuring condition	Description	Conclusion
-48V DC Power Port	Line to Line,-48V-RTN Level:±1 kV, repeat 5 times each Polarity Tr/Th:1.2/50 μs Interval: 60 seconds Phase: Asyn Line to Ground, -48V-PE,RTN-PE, -48V+RTN-PE Level:±1 kV/2.0 kV, repeat 5 times each Polarity Tr/Th:1.2/50 μs Interval: 60 seconds Phase: Asyn	No failure detected	Pass

Note: RTN=RETURN LEAD

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7.5 Immunity to Continuous Conducted Interference 0.15 MHz to 80 MHz

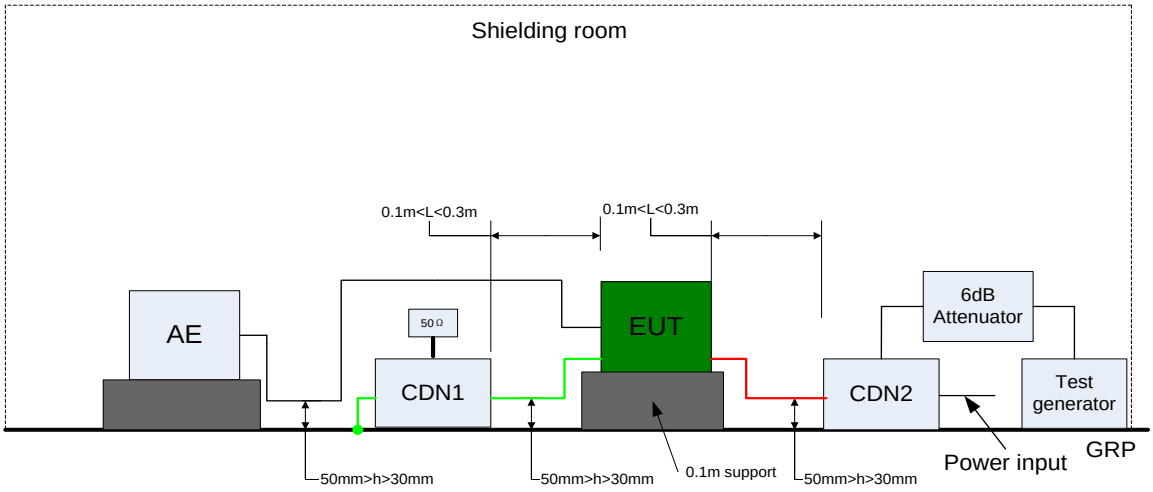
7.5.1 Test Procedure

The EUT was configured as described in section 4. The applied level was amplitude modulated by a 1 kHz sinusoidal signal to a modulation depth of 80%. The set-up and test methods were in accordance with IEC 61000-4-6 standard.

Table 26 Test requirements

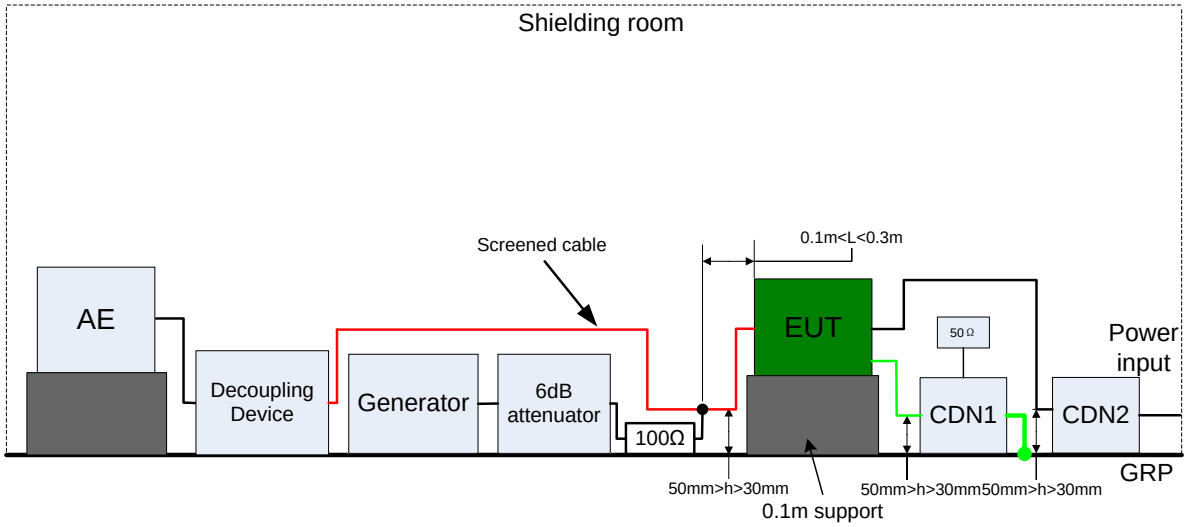
Sweep Frequency Range:	0.15 MHz to 80 MHz
Field Modulation:	80% Amplitude modulation at 1kHz sine wave
Maximum Step Size:	1%
Swept-Frequency Dwell Time:	1 second
Special Frequency Point:	0.2MHz;1MHz;7.1MHz;13.56MHz;21MHz;27.12MHz;40.68MHz; 2.048MHz; 25 MHz; 50 MHz; 3.84 MHz; 15.36 MHz; 61.44 MHz
Special Frequency Dwell Time:	60 seconds

The test set-up diagram is shown as below:



The cable connected to the EUT: red is power cable; green is earthing cable; black is signal cable

Figure 37. Test set-up of immunity to continuous conducted interference for power port



The cable connected to the EUT: red is screened signal cable; green is earth cable; black is power cable

Figure 38. Test set-up of immunity to continuous conducted interference for signal port with shielded cable

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7.5.2 Test Results

The EUT has met the requirements of Performance Criterion CT&CR defined in section 5 for immunity to continuous conducted interference.

Table 27 Test results of signal ports

Ports		Test Level (Unmodulated)	Coupling mode	Description	Conclusion
Indoor Signal Ports	E1	10 V (rms)	Direct inject	No failure detected	Pass
	FE	10 V (rms)	Direct inject	No failure detected	Pass
	GE	10 V (rms)	Direct inject	No failure detected	Pass

Table 28 Test results of DC power port

Ports	Test Level (Unmodulated)	Inject method	Description	Conclusion
DC Power Port	10 V (rms)	CDN-M2	No failure detected	Pass
Earth	10 V (rms)	CDN-M1	No failure detected	Pass

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7.6 Immunity to Pulse Magnetic Field

7.6.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were according to IEC 61000-4-9.
The test set-up diagram was shown as below:

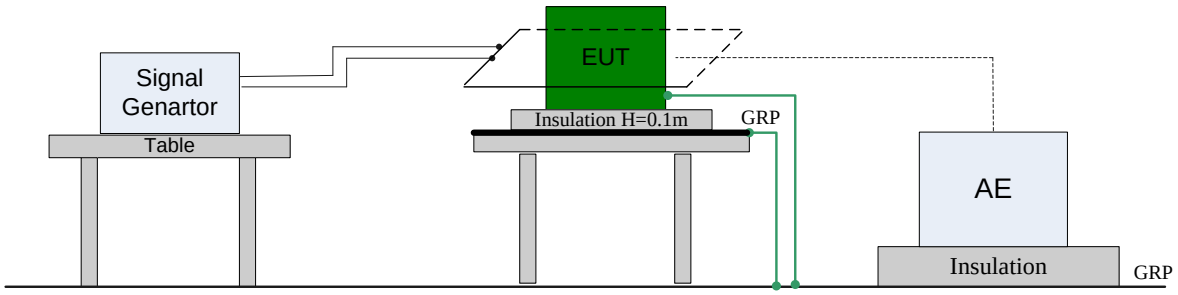

Figure 39. Test set-up of immunity to pulse magnetic field

7.6.2 Test Results

The EUT has met the requirements of Performance Criterion TT&TR for Immunity to Pulse Magnetic Field of enclosure port.

Table 29 Test Results for TC2

Coil Position	Three orthogonal position X Y Z
Test Level	300 A/m
Specification	Tr/Th: 6.4/16 μs Repeat 5 times each polarity Internal: 10 seconds
Test Method	Immersion method
Criterion	TT&TR
Description	No failure detected
Conclusion	Pass

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7.7 Immunity to Common Mode Conducted Disturbances of 0 Hz to 150 kHz

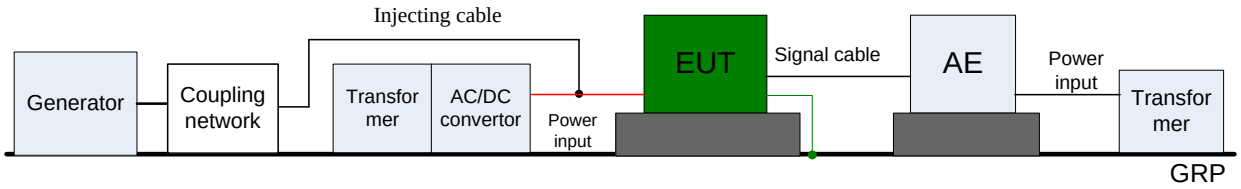
7.7.1 Test Procedure

The EUT was configured as described in section 4. The set-up and test methods were in accordance with IEC 61000-4-16 standard.

Table 30 Test requirements

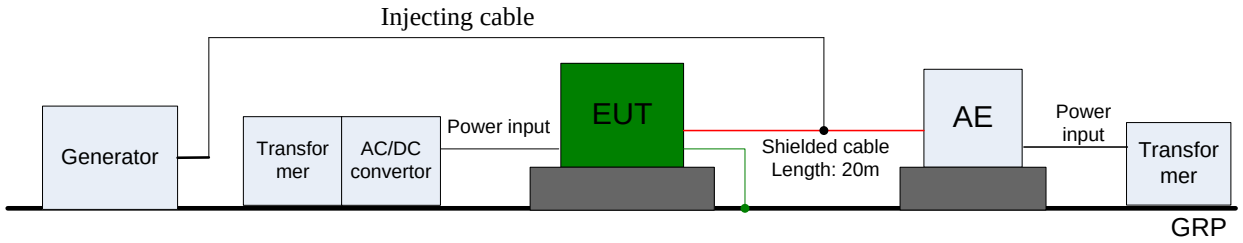
Spot Frequency Test:	0 Hz, 50Hz, 60Hz
Sweep Frequency Test:	15 Hz to 150 kHz
Test Level:	For Spot Frequency Continuous Disturbance: 10V For Spot Frequency Short Disturbance: 100V For Sweep Frequency Disturbance: 1-10V
Maximum Step Size:	1%
Swept-Frequency Dwell Time:	1 second
Spot Frequency Dwell Time:	For Continuous Disturbance: 60 seconds For Short Disturbance: 1 seconds

The test set-up diagram was shown as below:



The cable connected to the EUT: red: power cable; green: earth cable; black: signal cable

Figure 40. Test set-up of immunity to common mode conducted disturbances of 0 Hz to 150 kHz for DC power port



The cable connected to the EUT: red: shielded signal cable; green: earth cable; black: power cable

Figure 41. Test set-up of immunity to common mode conducted disturbances of 0 Hz to 150 kHz for signal port with shielded cable

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7.7.2 Test Results

The EUT has met the requirements of Performance Criterion CT&CR defined in section 5 for common mode conducted disturbances of 0 Hz to 150 kHz.

Table 31 Test results of signal ports for TC2

Ports		Coupling mode	Description	Conclusion
Signal Ports	GE	Direct inject	No failure detected	Pass
	E1	Direct inject	No failure detected	Pass

Table 32 Test results of DC power port for TC2

Ports	Inject Method	Description	Conclusion
DC power port	CN 16-L2	No failure detected	Pass

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7.8 Immunity to Voltage Dips and Short Interruption and Voltage Variation of DC Power Port

7.8.1 Test Procedure

The EUT was configured as described in section 4. The set-up and test methods were in accordance with IEC 61000-4-29 standard.

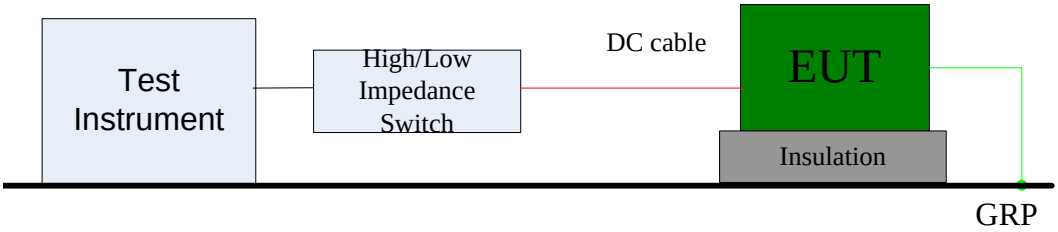

Figure 42. Test Set-up of Voltage Dips and Short Interruption and Voltage Variation of DC Power Port

7.8.2 Test Results

The EUT has met the requirements Performance Criterion defined in section 5.

Table 33 Test results for -48V DC power supply

Test Items	Measuring Condition	Performance Criterion		Description	Conclusion
Voltage dips	Voltage reduction 60% Duration: 1 ms, 3 ms, 10 ms, 30ms, 100 ms, 300 ms, 1000 ms Interval: 10 s Repeat 3 times	Refer to 5.3	☐With battery ☒Without battery	No failure detected	Pass
	Voltage reduction 30% Duration: 1 ms, 3 ms, 10 ms, 30ms, 100 ms, 300 ms, 1000 ms Interval: 10 s Repeat 3 times	Refer to 5.3	☐With battery ☒Without battery	No failure detected	Pass
Short interruption	High Impedance Duration: 1 ms, 3 ms, 10 ms, 30ms, 100 ms, 300 ms, 1000 ms Interval: 10 s Repeat 3 times	Refer to 5.3	☐With battery ☒Without battery	No failure detected	Pass
	Low Impedance Duration: 1 ms, 3 ms, 10 ms, 30ms, 100 ms, 300 ms, 1000 ms Interval: 10 s Repeat 3 times	Refer to 5.3	☐With battery ☒Without battery	No failure detected	Pass
Voltage variation	Variation level:80% Duration: 0.1 s, 0.3 s, 1 s, 3 s, 10 s Interval: 10s Repeat 3 times	CT&CR		No failure detected	Pass
	Variation level:120% Duration: 0.1 s, 0.3 s, 1 s, 3 s, 10 s Interval: 10 s Repeat 3 times	CT&CR		No failure detected	Pass

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8 Main Test Instruments

Table 34 Main test instruments

Test Item	Test Instrument	Model (S/N)	Manufacturer	Calibration Date	Calibration Interval (Month)
Radiated emission (3m chamber)	EMI Test Receiver	ESU40 (100303)	R&S	2017-01-21	12
	Bilog antenna	VULB 9163 (480)	SCHWARZBECK	2017-01-09	24
	Horn antenna	9120D (879)	SCHWARZBECK	2017-02-25	24
	Chamber _NSA	3m chamber	Albatross	2016-12-07	24
	Chamber _S_{VSWR}	3m chamber	Albatross	2016-12-07	24
Radiated Emission (10m chamber)	Spectrum Analyzer	E4447A (MY52090002)	Agilent	2017-01-21	12
	EMI receiver	N9038A (MY51210233)	Agilent	2017-01-20	12
	Bilog antenna	VULB 9163 (548)	SCHWARZBECK	2016-05-21	24
	Bilog antenna	VULB 9163 (549)	SCHWARZBECK	2016-12-02	24
	Chamber _NSA	10m chamber	Albatross	2016-02-04	24
Conducted emission	EMI test receiver	ESCI 3 (101619)	R&S	2017-01-21	12
	Artificial mains network	ENV4200 (100141)	R&S	2017-01-21	12
	Current probe	F-52 (111659)	FCC	2017-01-21	12
Electrostatic discharge	ESD simulator	NSG437 (398)	Teseq	2017-01-22	12
Immunity to radiated electric fields	Signal Generator	SG6000 (327339)	Aglient	2017-01-21	12
	Broadband Antenna	STLP 9128D (9128D036)	SCHWARZBECK	N/A	12
	Broadband antenna	STLP 9149 (9149-121)	SCHWARZBECK	N/A	12
	Amplifier	500W1000A (337312)	AR	2017-01-21	12
	Amplifier	175S1G4M3 (340318)	AR	2017-01-21	12
	Amplifier	NTWPAS-4060100 (16089043)	rflight	2016-10-30	12
Electrical fast transient bursts	Fast transient burst simulator	NSG2025 (32075)	SCHAFFNER	2017-01-21	12
	Coupling clamp	CDN8014 (31839)	SCHAFFNER	2017-01-21	12
SURGE	High energy pulse generator	VCS500N 10T (V1121109603)	EMTEST	2017-01-21	12

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	Coupling decoupling network	CNI504 S9 (V1121109605)	EMTEST	2016-09-26	12
	Coupling decoupling network	CNV 508 S16 (V1121109606)	EMTEST	2016-07-25	12
Immunity to continuous conducted interference	Signal generator	SMC100A (102618)	R&S	2017-01-21	12
	Amplifier	BBA100 (100984)	R&S	2017-01-21	12
	Coupling decoupling network	FCC-801-CDN-M2/M3 (111654)	FCC	2017-01-21	12
	Coupling decoupling network	FCC-801-CDN-M1(111651)	FCC	2017-01-21	12
	100 ohms resistance	CR100A (369)	LUTHI	2017-01-21	12
	6dB Attenuator	75-A-FFN-06 (1180092)	Bird	2017-01-21	12
Immunity to pulsed magnetic field	Generator	UCS500 M6B (V0608101192)	EMTEST	2017-01-21	12
	Pulsed magnetic Field Coil	MS 100 (0804-99)	EMTEST	2017-01-21	12
Immunity to conducted common mode disturbances of 0-150kHz	Low frequency signal source	CWS 500N4 (0221-0087)	EMTEST	2017-01-21	12
Voltage dips, short interruptions, and voltage variations of DC power ports	Programmable power	SW5250L(1141A00467)	Ametek	2017-01-21	12
		SW5250SL(1141A00460)	Ametek	2017-01-21	12
		SW INPUTFILTER (1141A00458)	Ametek	2017-01-21	12
		SW PDU (1138A04812)	Ametek	2017-01-21	12

Software Information			
Test Item	Software Name	Manufacturer	Version
Radiated Emission	EMC32	R&S	V8.5.3
Conducted Emission	EMC32	R&S	V8.3
Immunity to Radiated Electric Fields	Emcware	AR	V2.7.0
Immunity to Continuous Conducted Interference	EMC32	R&S	V8.5.1
Voltage Dips, Short Interruptions, and Voltage Variations of DC	Elgar	Ametek	V．A

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Power Ports			

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9 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 35 System measurement uncertainty

Items		Extended Uncertainty
Radiated emission	Field strength (dBμV/m)	U=4.3 dB; k=2 (30 MHz-1 GHz)
		U=4.20 dB; k=2 (1 GHz-6 GHz)
Conducted emission	Disturbance voltage (dBμV)	U=2.7dB; k=2

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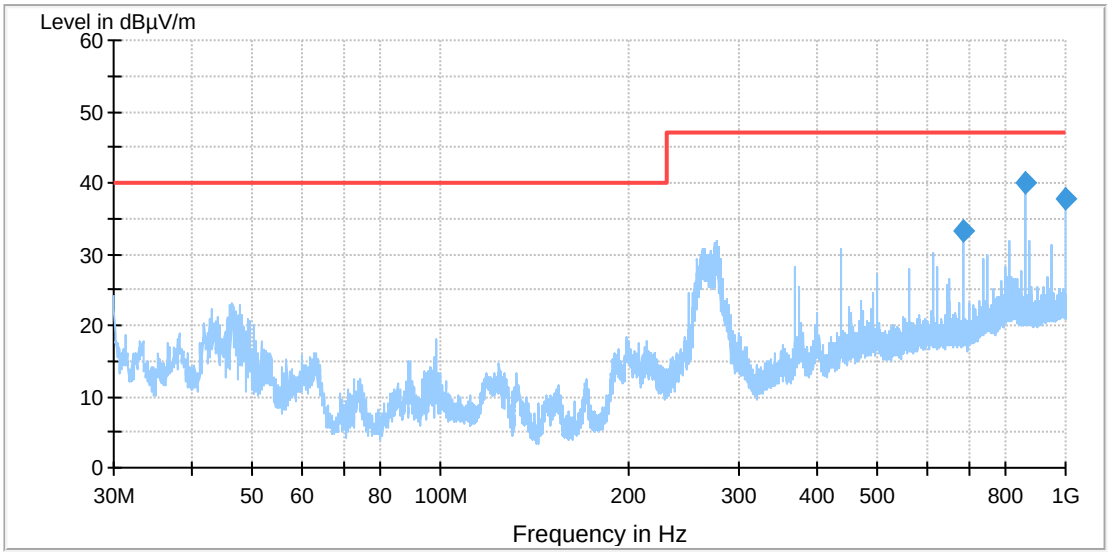
10 Graph and Data of Emission Test

10.1 Radiated Emission

10.1.1 Radiated Emission of TC1 and TC2

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
687.479500	33.1	-14.9	47.0	13.9	100.0	64.0	HORIZONTAL
860.153000	39.9	-11.7	47.0	7.1	100.0	10.0	HORIZONTAL
1000.000000	37.7	-9.9	47.0	9.3	100.0	295.0	HORIZONTAL

Note:
1.Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2.The configuration TC1 and TC2 were tested, and the worse test result is supplied.

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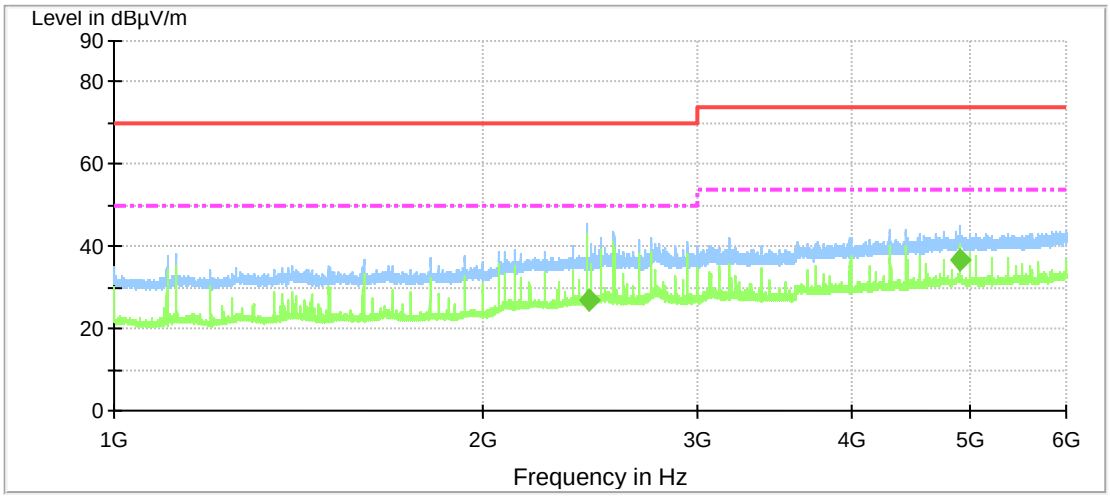
1GHz-6GHz



Measurement Result: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2446.912500	26.8	-7.5	50.0	23.2	168.0	5.0	VERTICAL
4915.390667	36.5	-1.7	54.0	17.5	139.0	5.0	VERTICAL

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configuration TC1 and TC2 were tested, and the worse test result is supplied.

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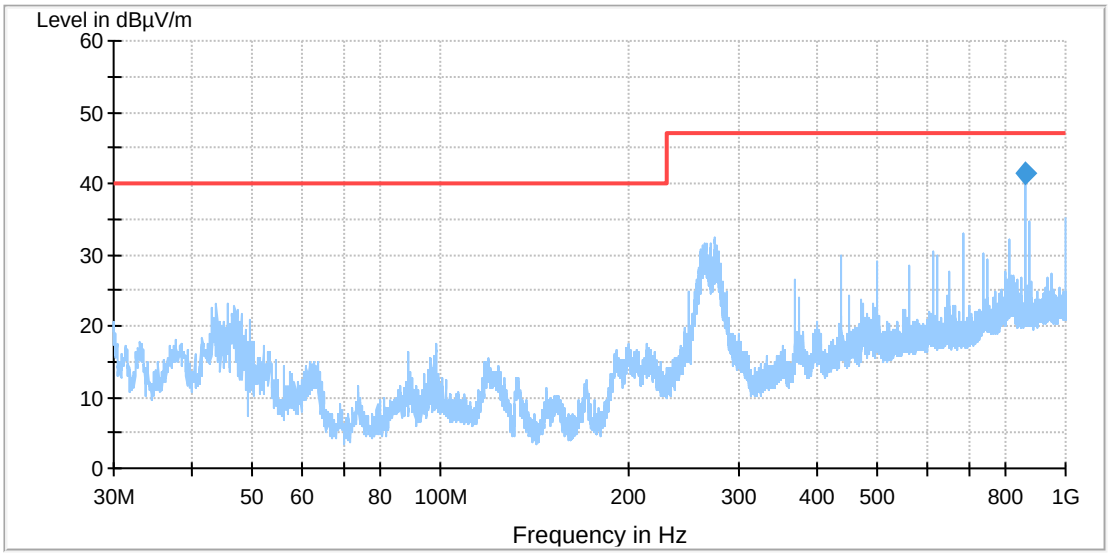
10.1.2 Radiated Emission of TC3 and TC4

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
860.153000	41.4	-11.7	47.0	5.6	100.0	303.0	VERTICAL

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configuration TC3 and TC4 were tested, and the worse test result is supplied.

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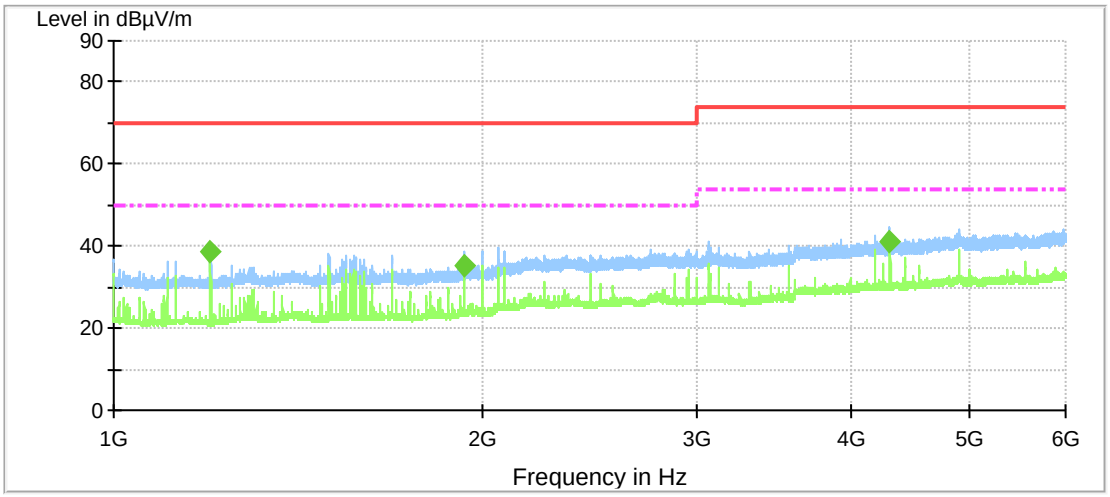
1GHz-6GHz



Measurement Result: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1200.000000	38.7	-12.5	50.0	11.3	110.0	238.0	HORIZONTAL
1937.412500	35.1	-10.1	50.0	14.9	100.0	58.0	VERTICAL
4312.605667	40.9	-3.5	54.0	13.1	100.0	353.0	VERTICAL

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configuration TC3 and TC4 were tested, and the worse test result is supplied.

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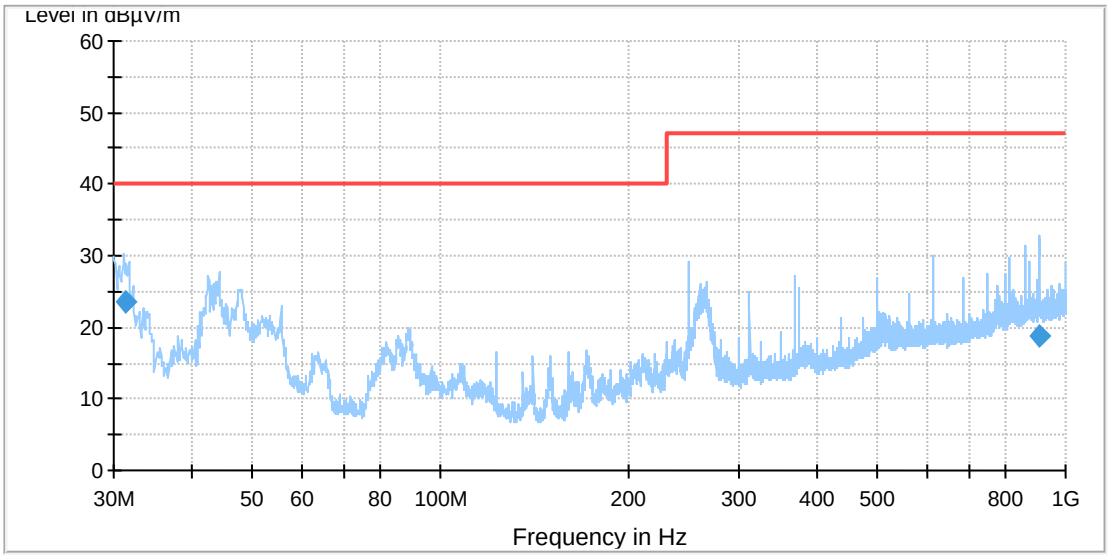
10.1.3 Radiated Emission of TC5 and TC6

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
31.319820	23.7	-26.7	40.0	16.3	100.0	260.0	VERTICAL
909.433500	18.9	-11.3	47.0	28.1	107.0	293.0	HORIZONTAL

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configuration TC5 and TC6 were tested, and the worse test result is supplied.

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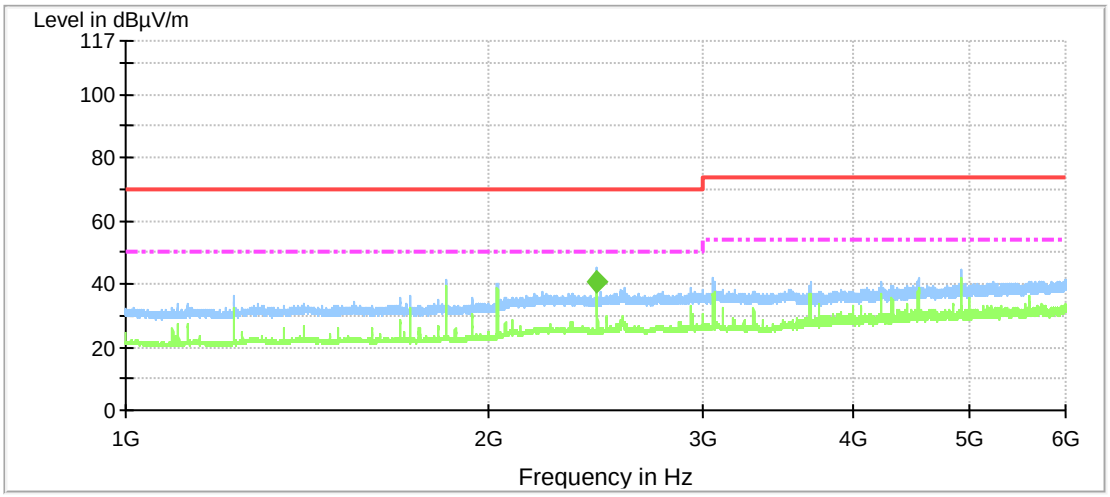
1GHz-6GHz



Measurement Result: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2457.778167	40.8	-7.5	50.0	9.2	100.0	276.0	VERTICAL

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configuration TC5 and TC6 were tested, and the worse test result is supplied.

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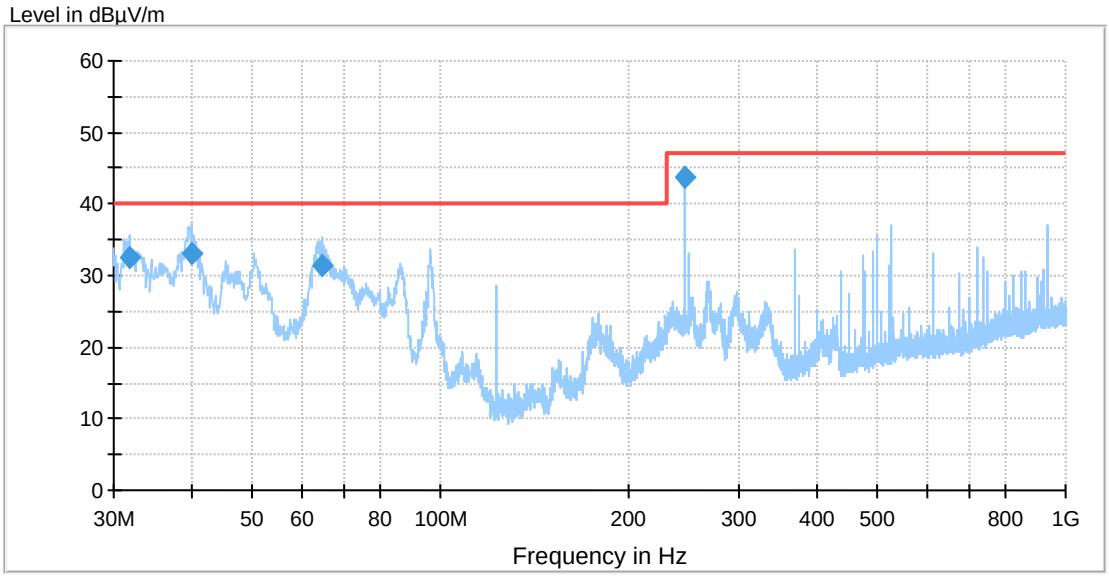
10.1.4 Radiated Emission of TC7

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
31.863785	32.6	-25.7	40.0	7.4	100.0	290.0	VERTICAL
40.091045	33.0	-24.4	40.0	7.0	100.0	-1.0	VERTICAL
64.822370	31.3	-26.9	40.0	8.7	100.0	338.0	VERTICAL
245.759500	43.0	-24.0	47.0	4.0	107.0	274.0	HORIZONTAL

Notes:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.

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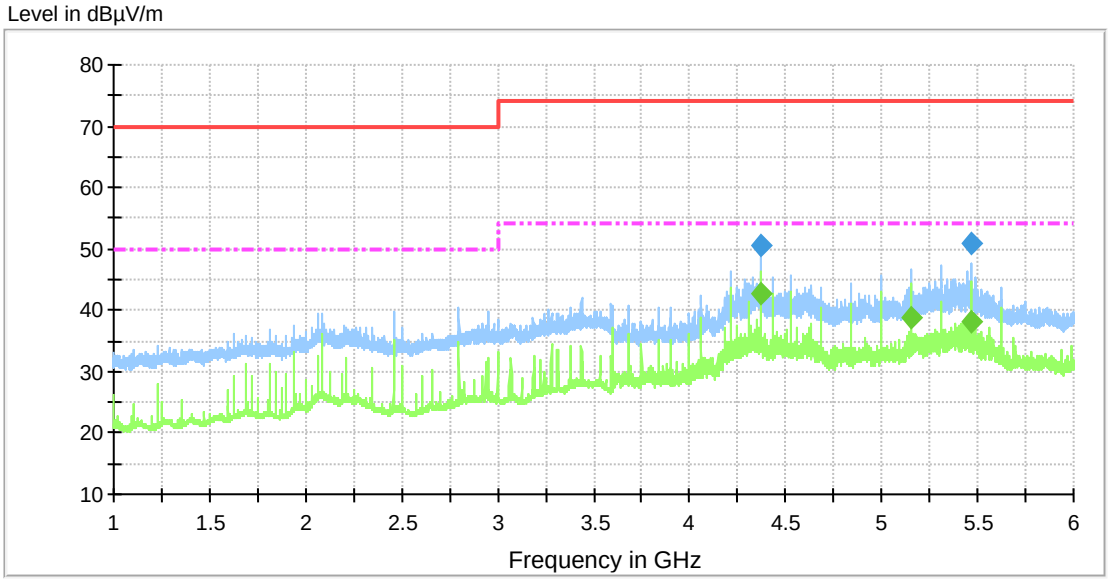
1GHz-6GHz



Measurement Result: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
4375.191167	50.5	-2.9	74.0	23.5	100.0	193.0	VERTICAL
5468.589833	50.9	-0.2	74.0	23.1	200.0	229.0	HORIZONTAL

Measurement Result: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
4375.191167	42.6	-2.9	54.0	11.4	100.0	195.0	VERTICAL
5156.317500	38.9	-1.0	54.0	15.1	190.0	254.0	HORIZONTAL

Note:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.

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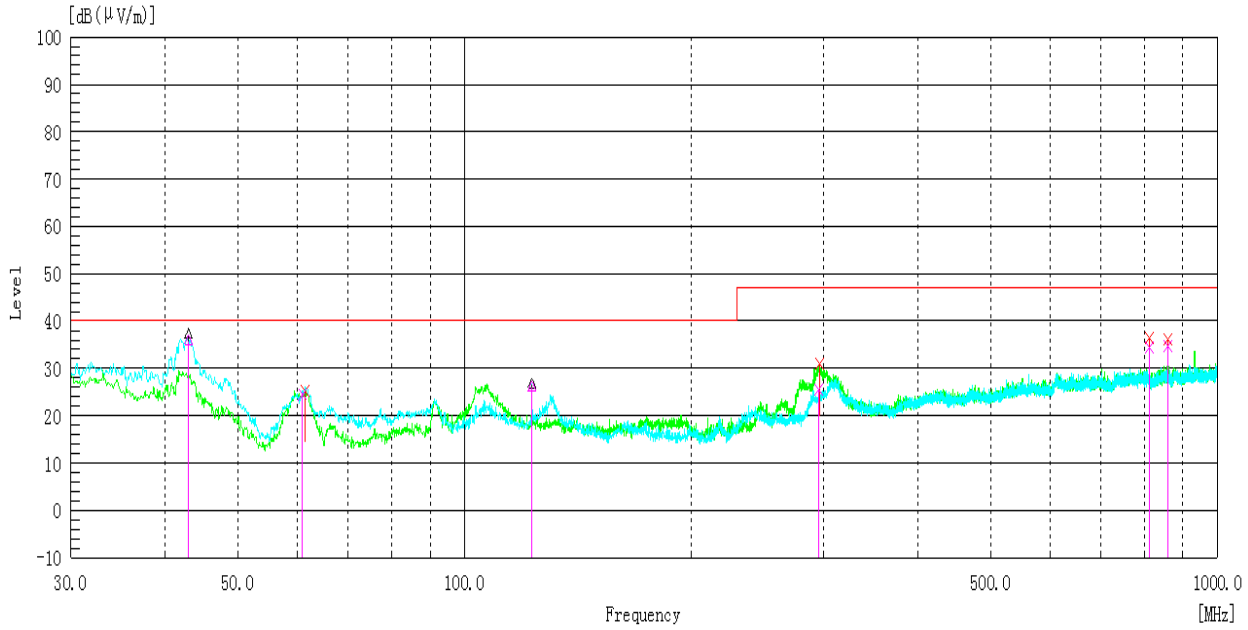
10.1.5 Radiated Emission of TC8-TC9

30MHz-1GHz:



No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	42.971	V	56.6	-20.8	35.8	40.0	4.2	102.0	238.0
2	60.963	H	51.0	-26.5	24.5	40.0	15.5	292.0	1.0
3	122.887	V	45.7	-19.7	26.0	40.0	14.0	100.0	257.0
4	295.561	H	43.0	-17.5	25.5	47.0	21.5	102.0	277.0
5	812.497	H	43.9	-9.6	34.3	47.0	12.7	100.0	142.0
6	860.155	H	43.4	-8.7	34.7	47.0	12.3	100.0	55.0

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The TC8-TC9 were tested, and the worse test result was supplied.

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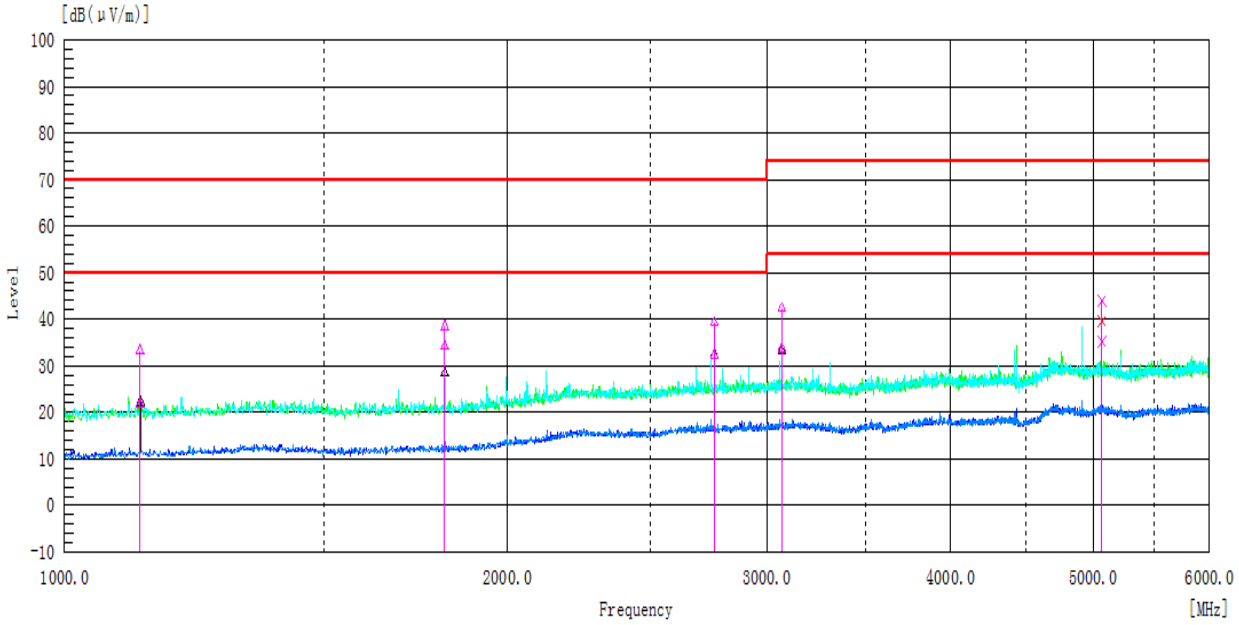
1GHz-6GHz



No.	Frequency	(P)	Reading PK	Reading AV	c.f	Result PK	Result AV	Limit PK	Limit AV	Margin PK	Margin AV	Height	Angle
	[MHz]		[dB(μV)]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[dB]	[cm]	[°]
1	1124.830	V	46.5	34.9	-13.2	33.3	21.7	70.0	50.0	36.7	28.3	102.0	159.0
2	1812.596	V	50.0	45.8	-11.6	38.4	34.2	70.0	50.0	31.6	15.8	102.0	208.0
3	2764.801	V	47.2	40.1	-7.9	39.3	32.2	70.0	50.0	30.7	17.8	129.0	12.0
4	3072.145	V	49.6	41.1	-7.3	42.3	33.8	74.0	54.0	31.7	20.2	201.0	209.0
5	5068.902	H	47.3	38.6	-3.3	44.0	35.3	74.0	54.0	30.0	18.7	195.0	354.0

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The TC8-TC9 were tested, and the worse test result was supplied.

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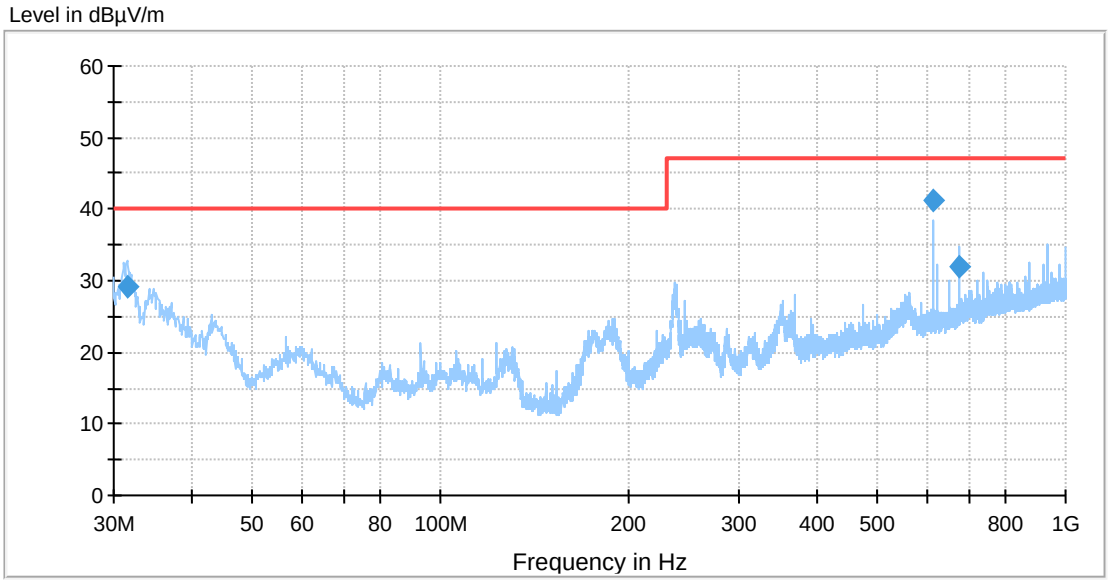
10.1.6 Radiated Emission of TC10

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
31.634240	29.1	-25.7	40.0	10.9	100.0	155.0	VERTICAL
614.413000	41.1	-15.2	47.0	5.9	130.0	120.0	HORIZONTAL
674.975000	31.8	-14.6	47.0	15.2	142.0	134.0	HORIZONTAL

Notes:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.

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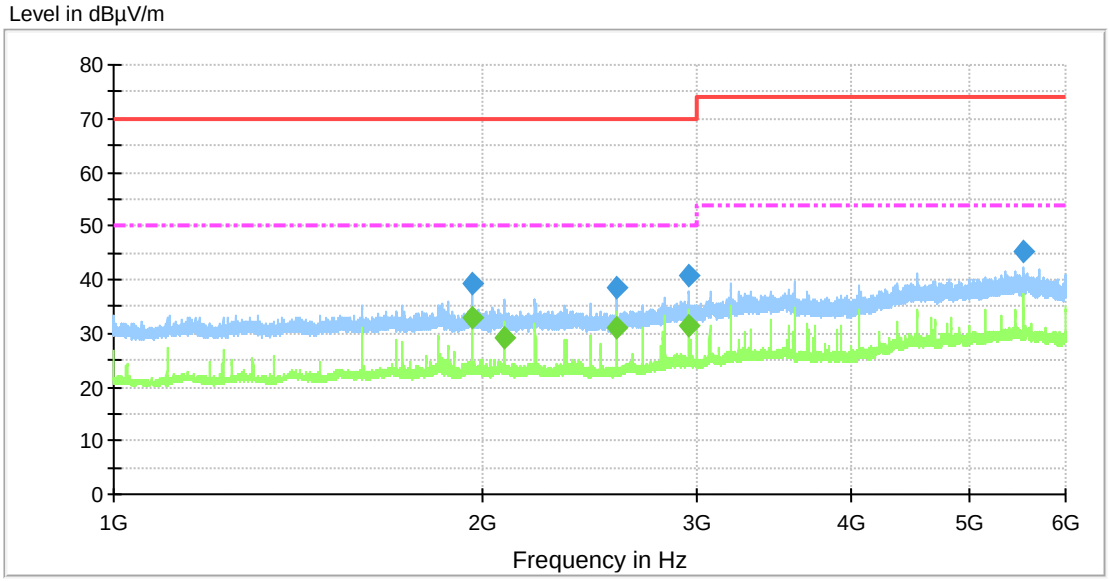
1GHz-6GHz



Measurement Result: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1966.170000	39.4	-9.5	70.0	30.6	100.0	178.0	VERTICAL
2580.631833	38.4	-8.6	70.0	31.6	105.0	182.0	VERTICAL
2949.055000	40.9	-7.1	70.0	29.1	150.0	165.0	HORIZONTAL
5550.015667	45.1	-0.2	74.0	28.9	196.0	218.0	HORIZONTAL

Measurement Result: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1966.170000	32.8	-9.5	50.0	17.2	100.0	178.0	VERTICAL
2088.955000	29.0	-9.4	50.0	21.0	100.0	215.0	VERTICAL
2580.397500	31.0	-8.6	50.0	19.0	100.0	178.0	VERTICAL
2949.055000	31.5	-7.1	50.0	18.5	200.0	194.0	HORIZONTAL

Note:
1.Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The TC10-TC14 were tested, and the worse test result was supplied.

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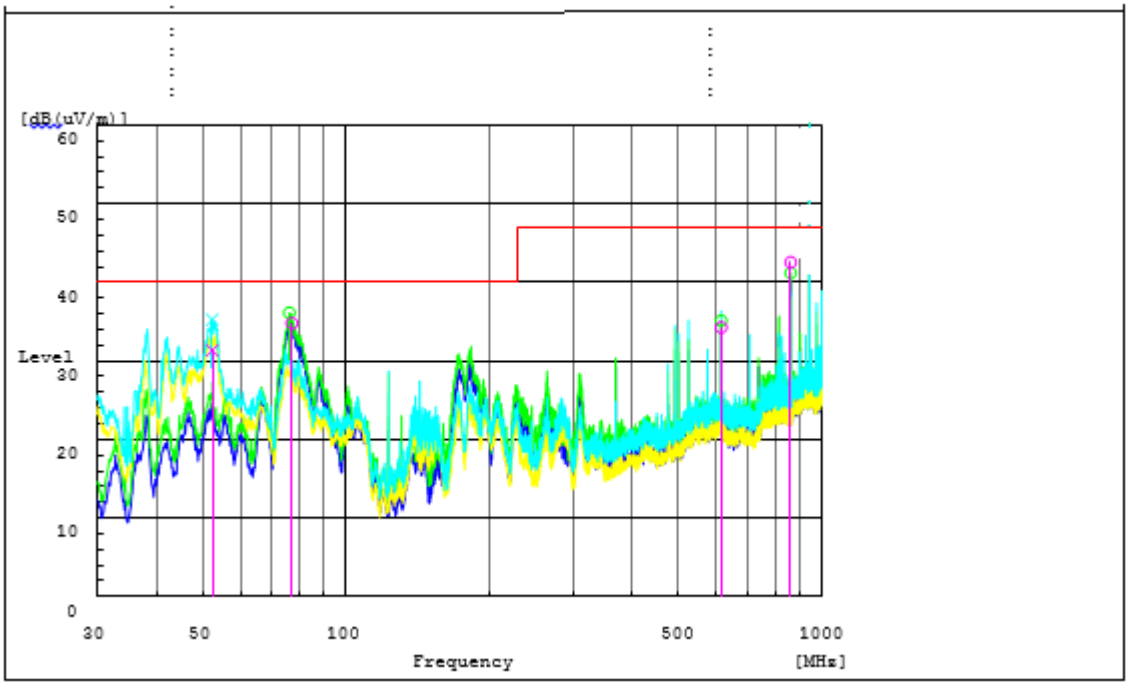
10.1.7 Radiated Emission of TC11~TC14

30MHz-1GHz:



Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
52.368	31.3	-23.5	40.0	8.7	100.0	235.0	V
76.998	34.8	-28.7	40.0	5.2	250.0	184.0	H
614.398	34.3	-13.8	47.0	12.7	206.0	190.0	H
860.165	42.6	-11.1	47.0	4.4	100.0	302.0	H

Note:
1.Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. The TC11-TC14 were tested, and the worse test result was supplied.

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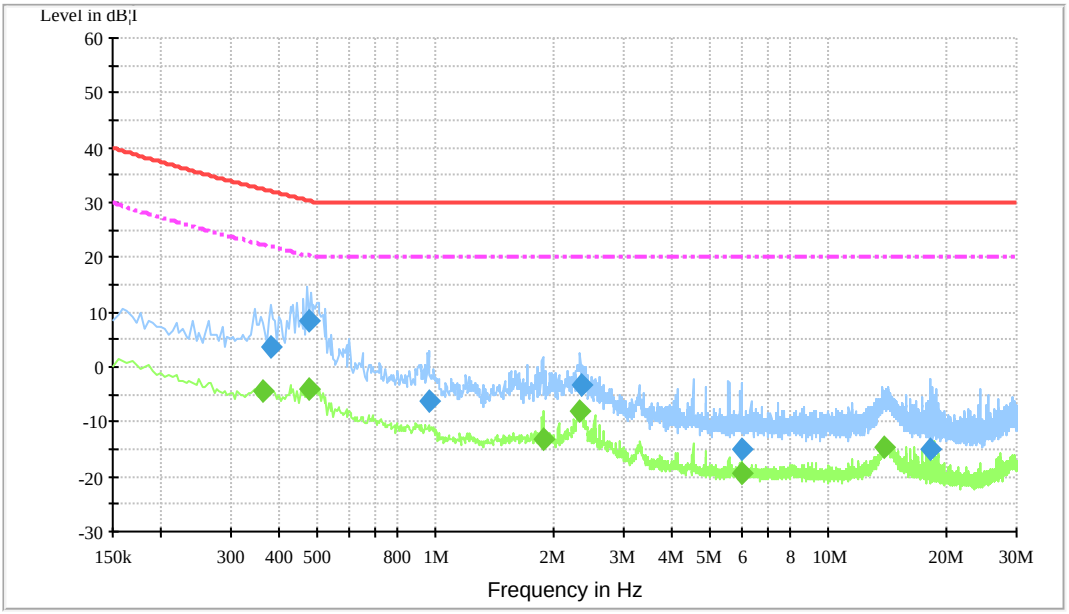
10.2 Conducted Disturbance

10.2.1 FE Port of UMPT Test Data



Measurement Result: QP Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.379499	3.5	-2.7	32.0	28.5	---	---
0.474000	8.6	-3.9	30.4	21.8	---	---
0.964800	-6.4	-8.0	30.0	36.4	---	---
2.334360	-3.3	-10.5	30.0	33.3	---	---
6.006000	-15.0	-13.4	30.0	45.0	---	---
18.095250	-15.0	-14.8	30.0	45.0	---	---

Measurement Result: AV Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.361500	-4.6	-2.4	22.3	26.9	---	---
0.474000	-4.0	-3.9	20.4	24.4	---	---
1.878345	-13.3	-9.7	20.0	33.3	---	---
2.320860	-8.0	-10.4	20.0	28.0	---	---
5.992500	-19.6	-13.4	20.0	39.6	---	---
13.886715	-14.6	-14.5	20.0	34.6	---	---

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

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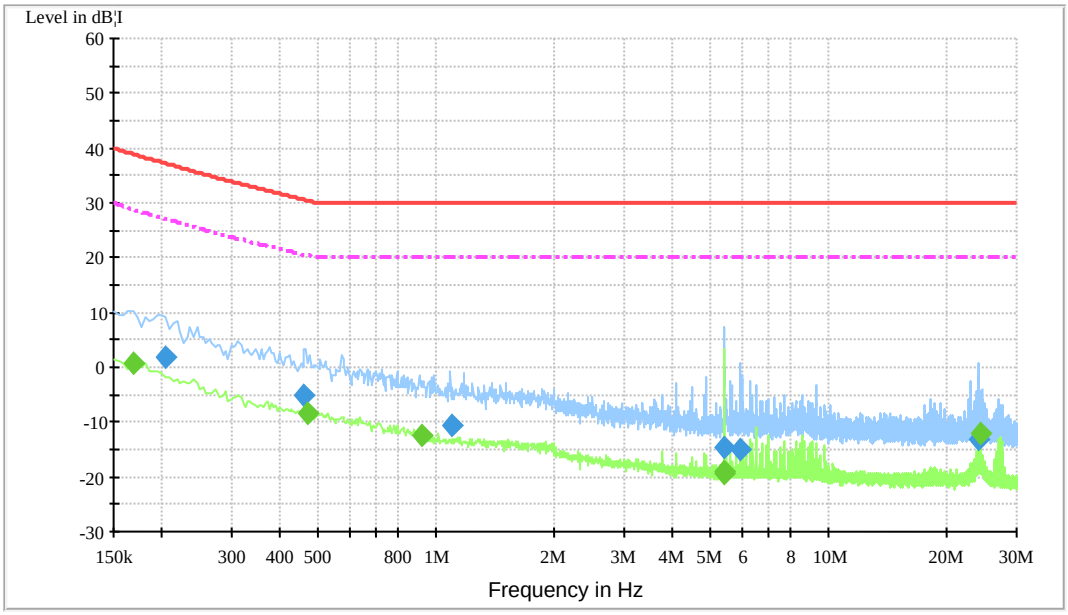
10.2.2 GE Ports of UMPT Test Data



Measurement Result: QP Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.204000	1.9	2.2	37.2	35.3	---	---
0.460500	-5.3	-3.8	30.6	35.9	---	---
1.086908	-10.8	-8.4	30.0	40.8	---	---
5.415015	-14.5	-13.3	30.0	44.5	---	---
5.934360	-14.9	-13.4	30.0	44.9	---	---
23.978798	-13.2	-15.3	30.0	43.2	---	---

Measurement Result: AV Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.168000	0.6	3.6	28.9	28.3	---	---
0.469500	-8.5	-3.9	20.4	28.9	---	---
0.914925	-12.4	-7.6	20.0	32.4	---	---
5.374582	-19.5	-13.3	20.0	39.5	---	---
5.419515	-19.0	-13.3	20.0	39.0	---	---
24.180600	-12.1	-15.3	20.0	32.1	---	---

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

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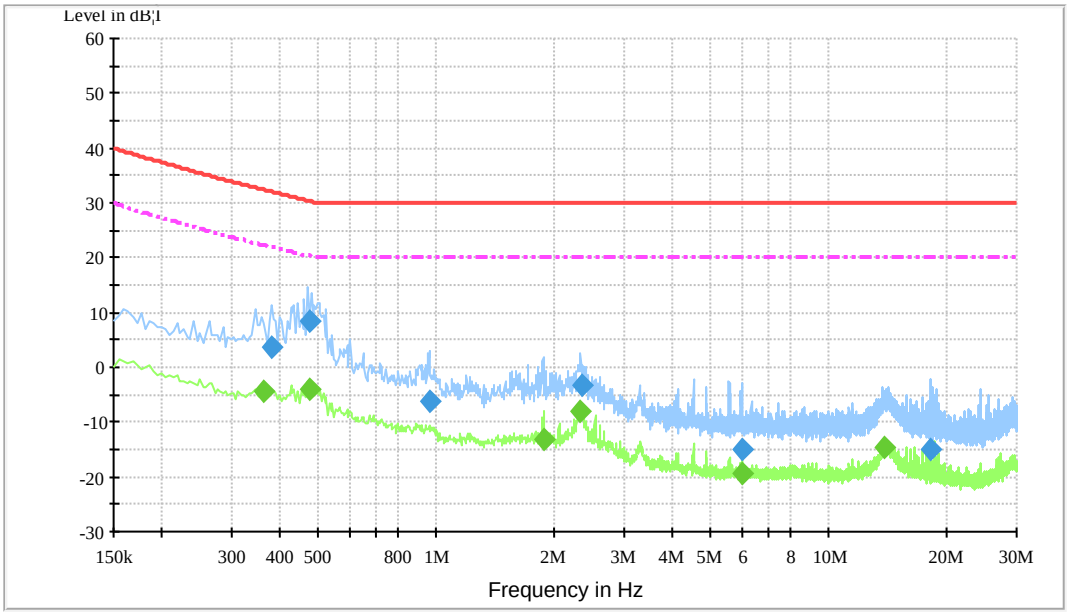
10.2.3 E1 Ports of UMPT Test Data



Measurement Result: QP Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.379499	3.5	-2.7	32.0	28.5	---	---
0.474000	8.6	-3.9	30.4	21.8	---	---
0.964800	-6.4	-8.0	30.0	36.4	---	---
2.334360	-3.3	-10.5	30.0	33.3	---	---
6.006000	-15.0	-13.4	30.0	45.0	---	---
18.095250	-15.0	-14.8	30.0	45.0	---	---

Measurement Result: AV Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
0.361500	-4.6	-2.4	22.3	26.9	---	---
0.474000	-4.0	-3.9	20.4	24.4	---	---
1.878345	-13.3	-9.7	20.0	33.3	---	---
2.320860	-8.0	-10.4	20.0	28.0	---	---
5.992500	-19.6	-13.4	20.0	39.6	---	---
13.886715	-14.6	-14.5	20.0	34.6	---	---

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

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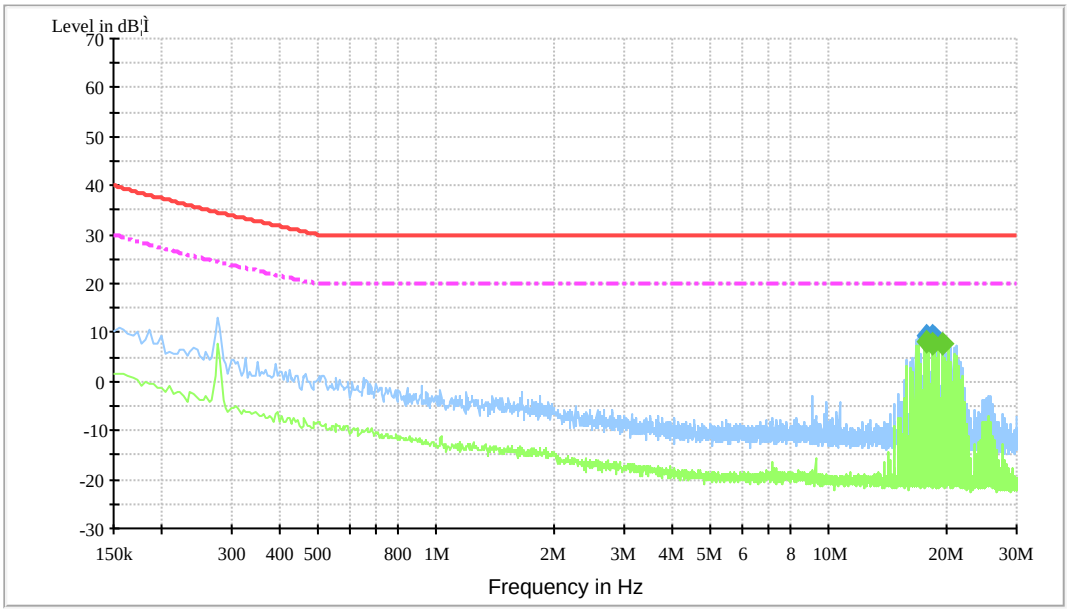
10.2.4 E1 Ports of UTRP Test Data



Measurement Result: QP Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
17.688045	9.4	-14.8	30.0	20.6	---	---
18.238800	9.5	-14.8	30.0	20.5	---	---
18.516405	9.0	-14.8	30.0	21.0	---	---

Measurement Result: AV Detector

Frequency MHz	Level (dBµA)	Transd dB	Limit (dBµA)	Margin dB	Line	PE
17.688068	8.3	-14.8	20.0	11.7	---	---
18.238800	7.7	-14.8	20.0	12.3	---	---
19.344765	7.6	-14.9	20.0	12.4	---	---

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

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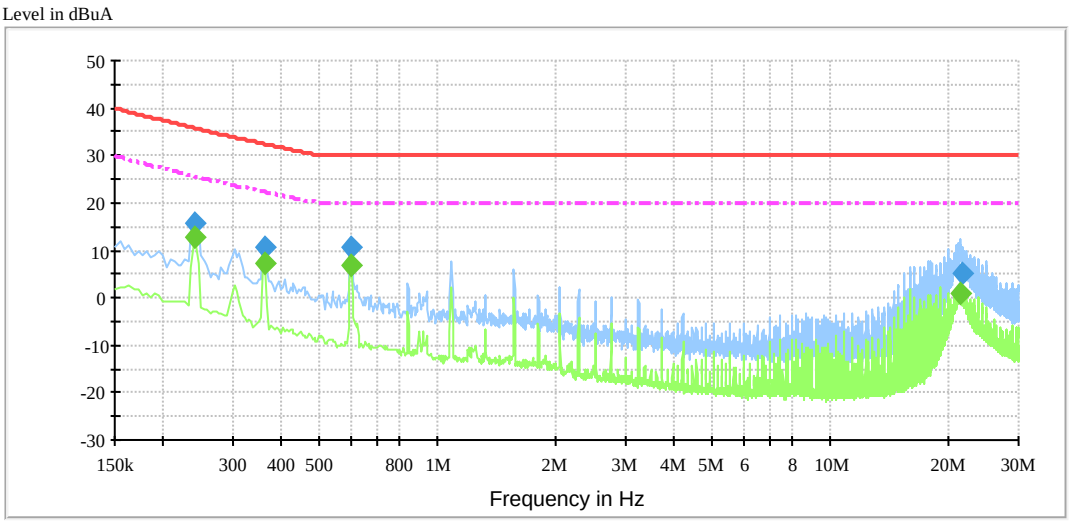
10.2.5 GE Ports of UMPTe Test Data



Measurement Result: QP Detector

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Line	PE
0.240000	15.8	1.9	35.8	20.0	---	---
0.361500	10.5	-1.5	32.4	21.9	---	---
0.600000	10.6	-5.1	30.0	19.4	---	---
21.628492	5.2	-16.1	30.0	24.8	---	---

Measurement Result: AV Detector

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Line	PE
0.240000	12.9	1.9	25.6	12.7	---	---
0.361500	7.2	-1.5	22.3	15.1	---	---
0.600000	7.0	-5.1	20.0	13.0	---	---
21.309938	1.0	-16.1	20.0	19.0	---	---

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

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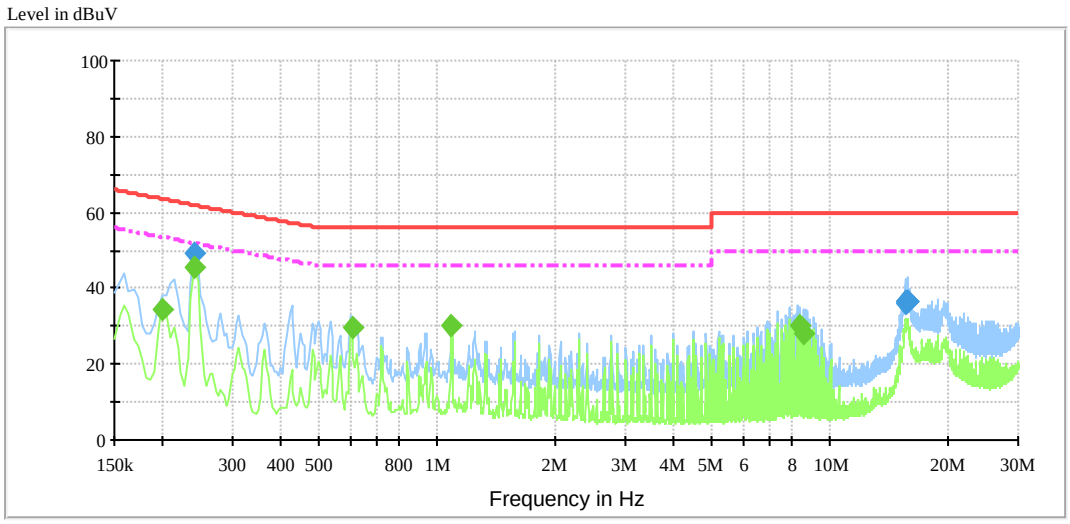
10.2.6 -48V DC Power Port Test Data



Measurement Result: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.240000	49.4	10.5	61.9	12.5	N	GND
15.529800	36.0	10.5	60.0	24.0	N	GND
15.596872	36.7	10.5	60.0	23.3	N	GND
15.605805	36.5	10.4	60.0	23.5	L3	GND
15.664485	36.8	10.5	60.0	23.2	N	GND
15.695602	36.4	10.4	60.0	23.6	L3	GND

Measurement Result: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.199500	34.3	10.5	53.5	19.1	N	GND
0.240000	45.6	10.5	51.9	6.2	N	GND
0.604500	29.4	10.4	46.0	16.6	L3	GND
1.085070	30.0	10.4	46.0	16.0	L3	GND
8.311935	30.0	10.5	50.0	20.0	N	GND
8.558198	28.1	10.5	50.0	21.9	N	GND

Note:
1. Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configurations TC1 to TC10 were tested, and the worst test result is supplied.

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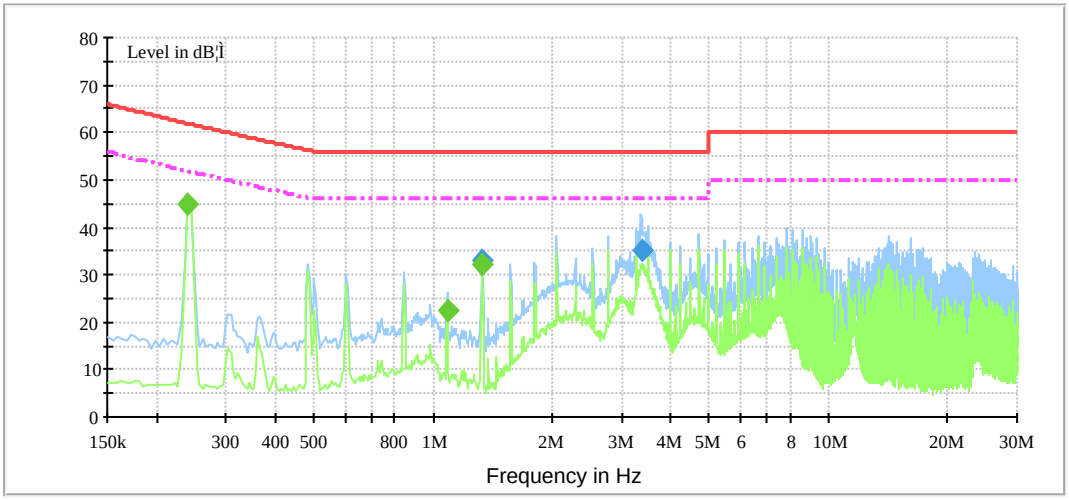
10.2.7 -48V DC Power Port Test Data of TC11~TC14



Measurement Result: QP Detector

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
1.326855	32.8	10.1	56.0	23.2	N	GND
3.364185	35.3	10.1	56.0	20.7	L3	GND

Measurement Result: AV Detector

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.240000	45.0	10.0	51.9	6.9	L3	GND
1.085070	22.6	10.1	46.0	23.4	N	GND
1.326855	32.1	10.1	46.0	13.9	N	GND

Note:
1. Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.
2. The configurations TC11 to TC14 were tested, and the worst test result is supplied.

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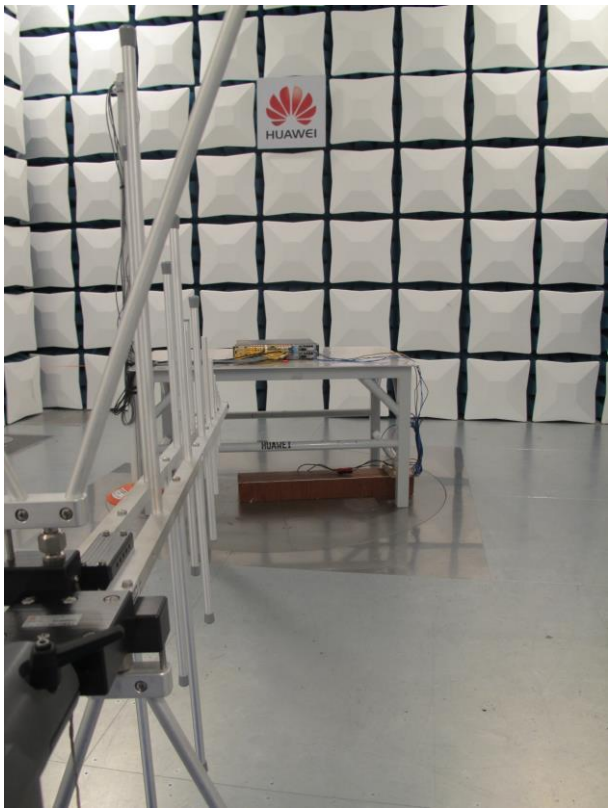
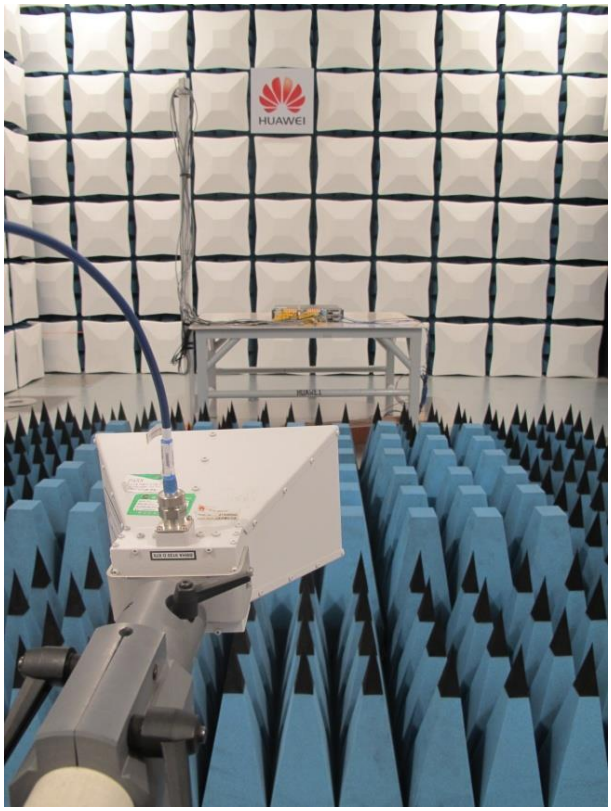
11 Photographs of Test Set-up

11.1 Emissions



Radiated Disturbance (30MHz-1GHz)



Radiated emission for 1 GHz to 6 GHz

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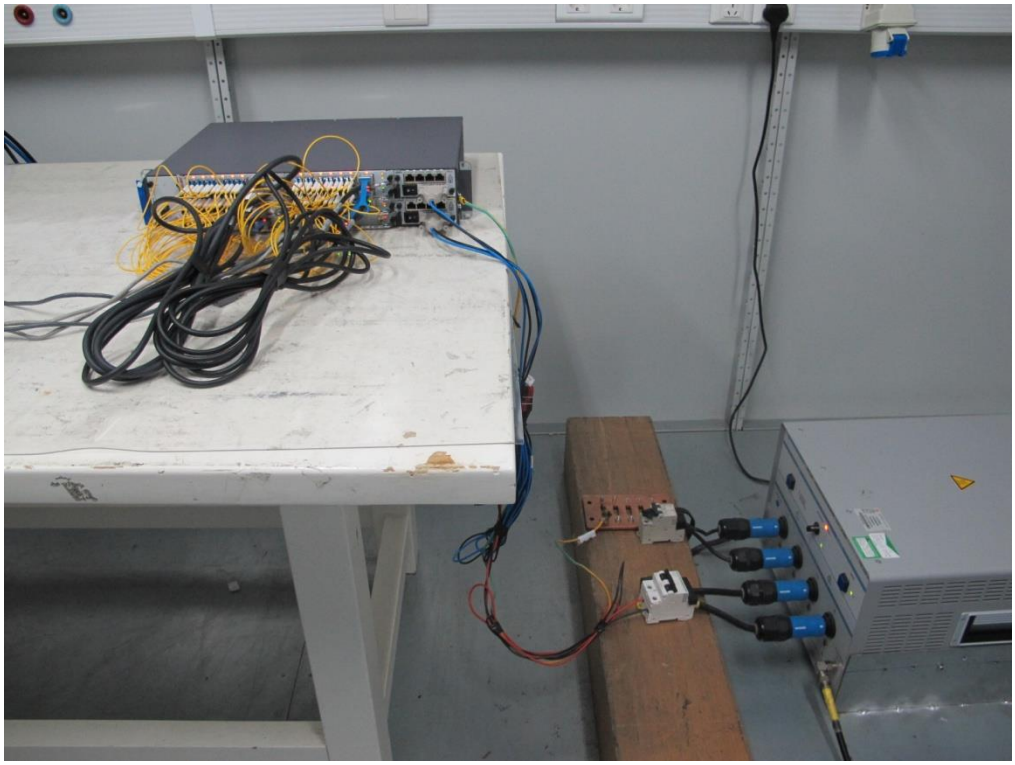
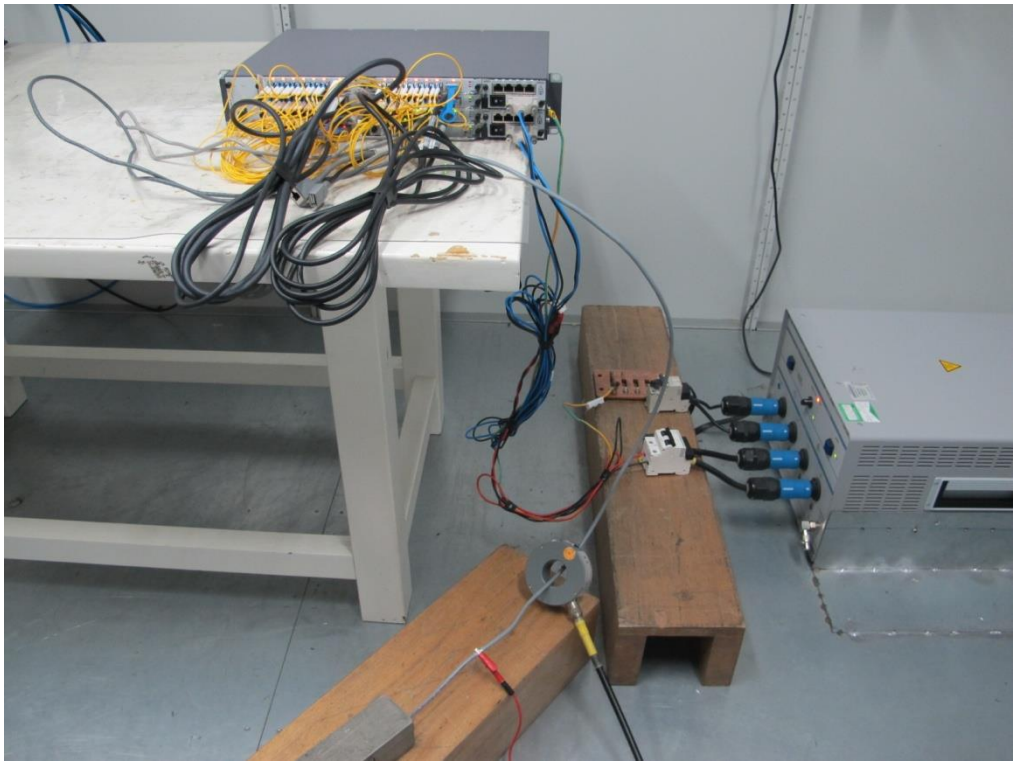


Conducted emissions of DC power port



Conducted emissions of telecommunication port

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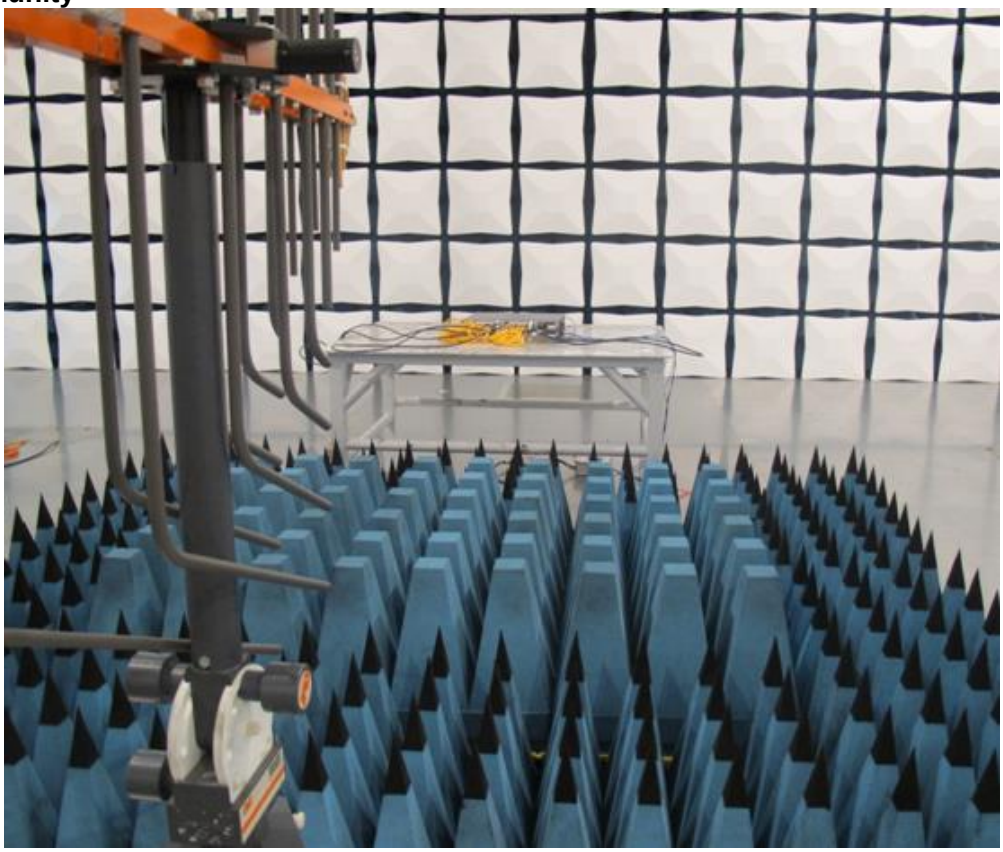
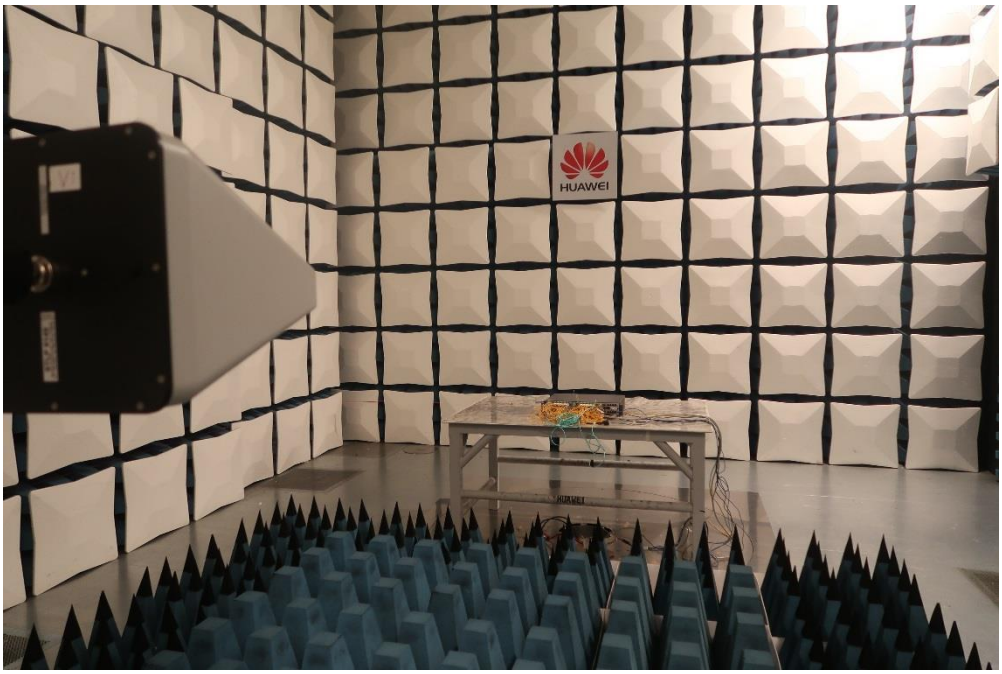
11.2 Immunity





Immunity to radiated electric fields

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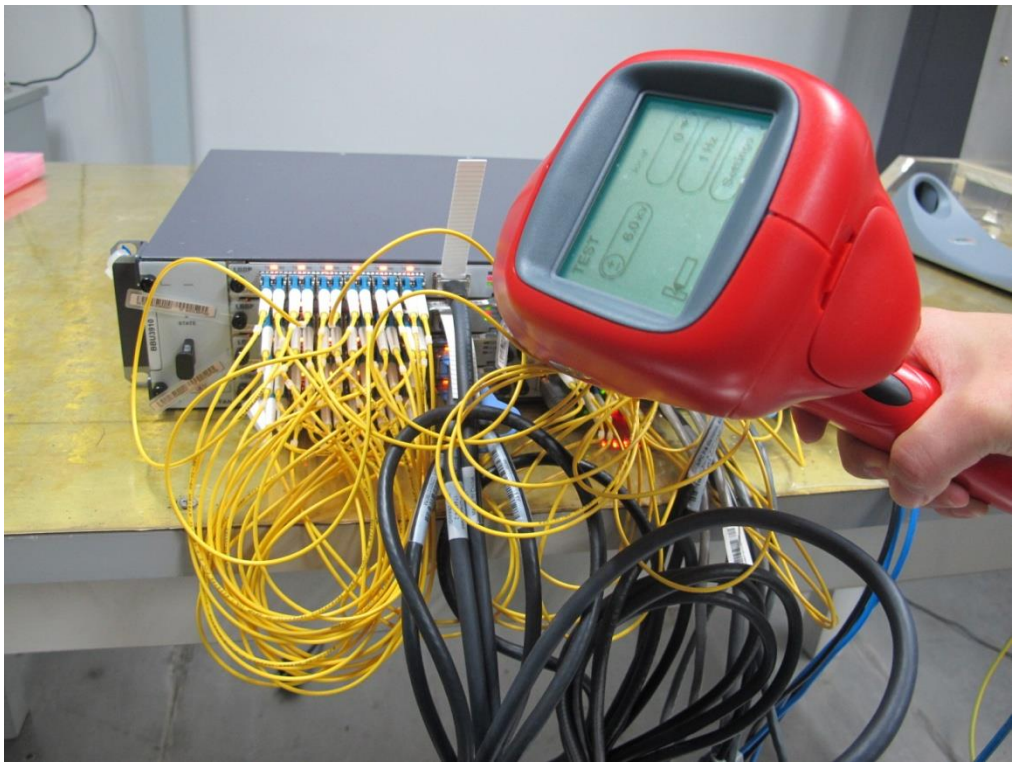

Electrostatic discharge

Immunity to electrical fast transient bursts of DC power port

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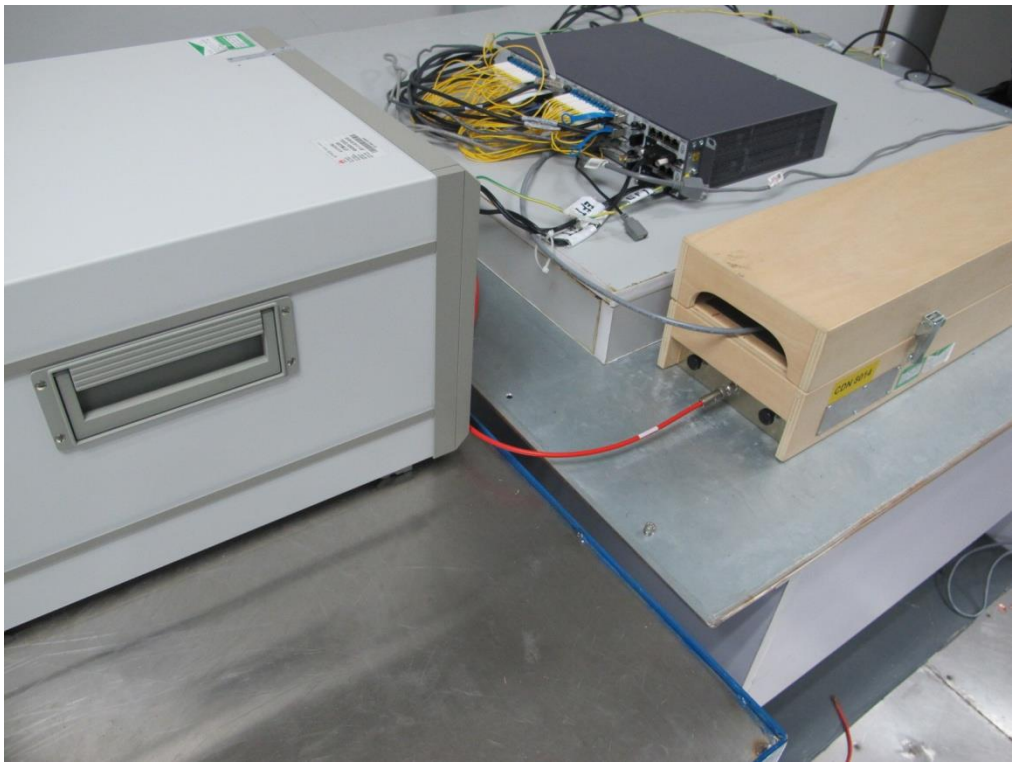

Immunity to electrical fast transient bursts of signal port

Immunity to surges of DC power port

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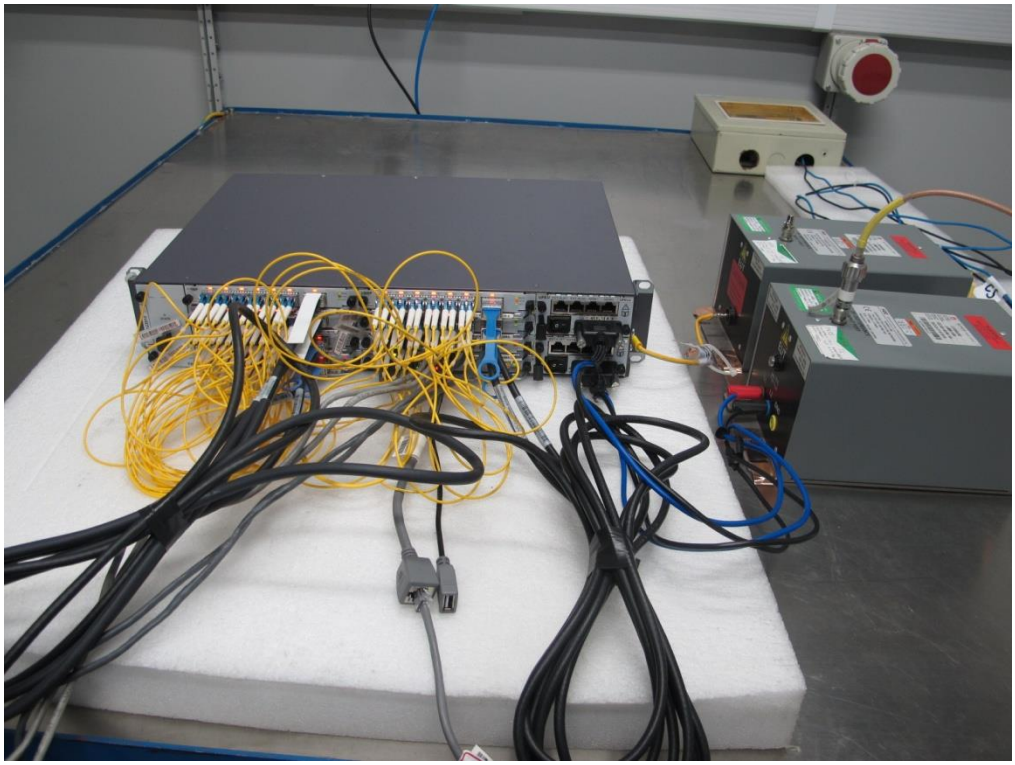
Immunity to surges of signal port



Immunity to continuous conducted interference of DC power port

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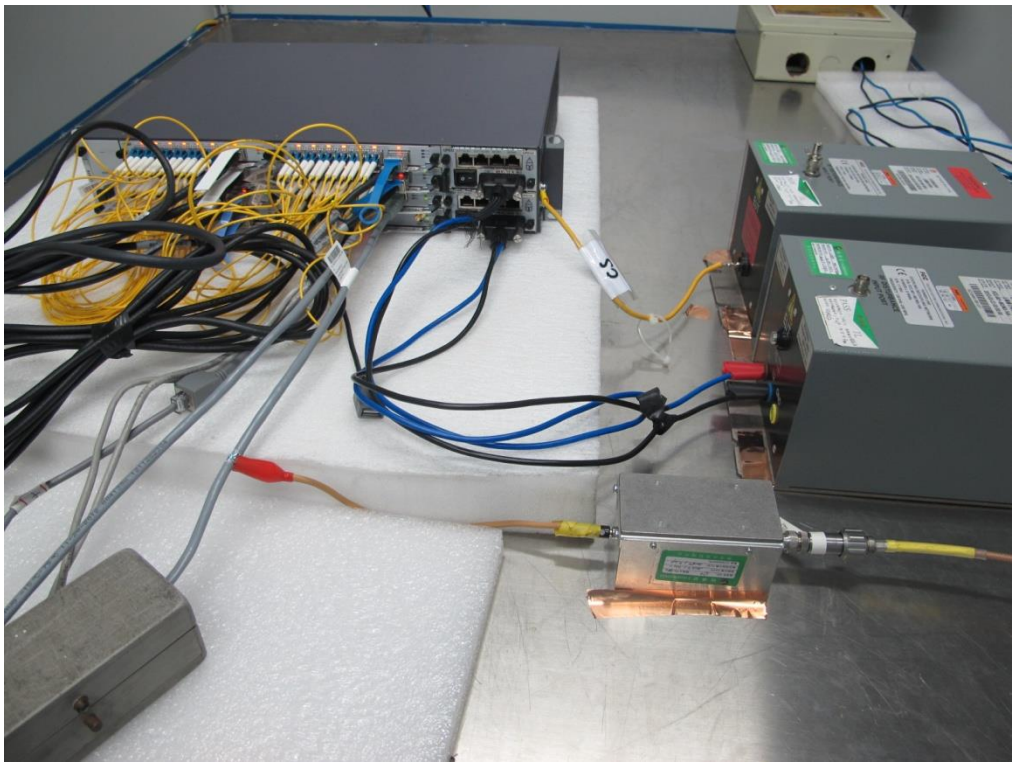
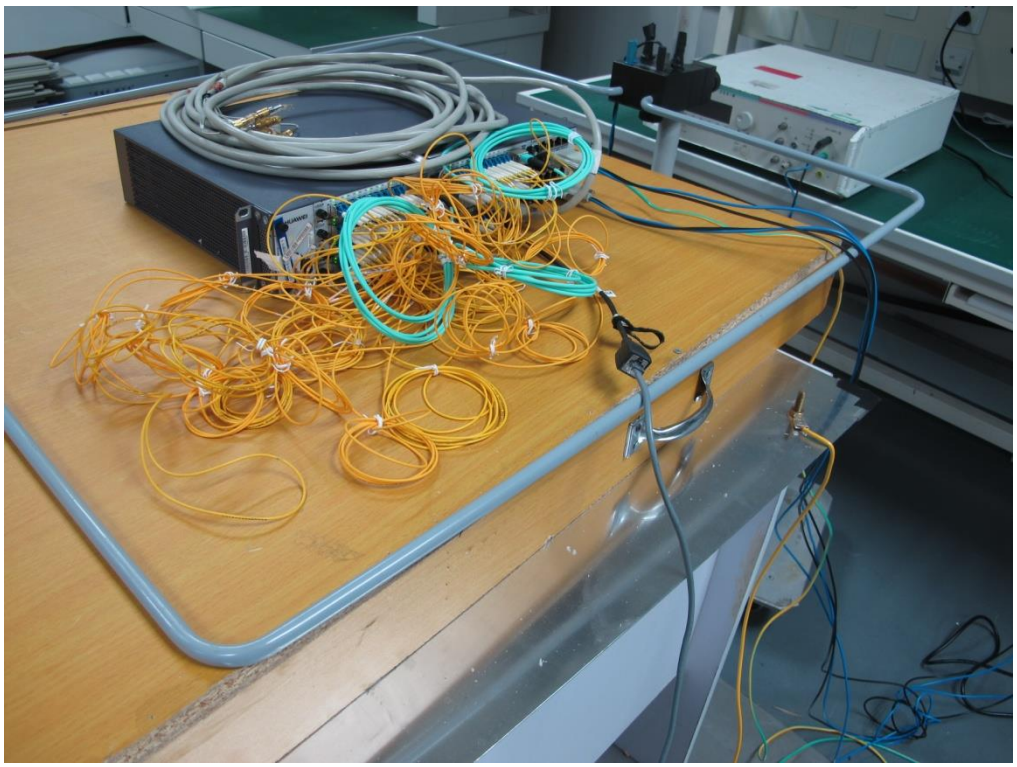


Immunity to continuous conducted interference of signal port



Immunity to Pulse Magnetic Field

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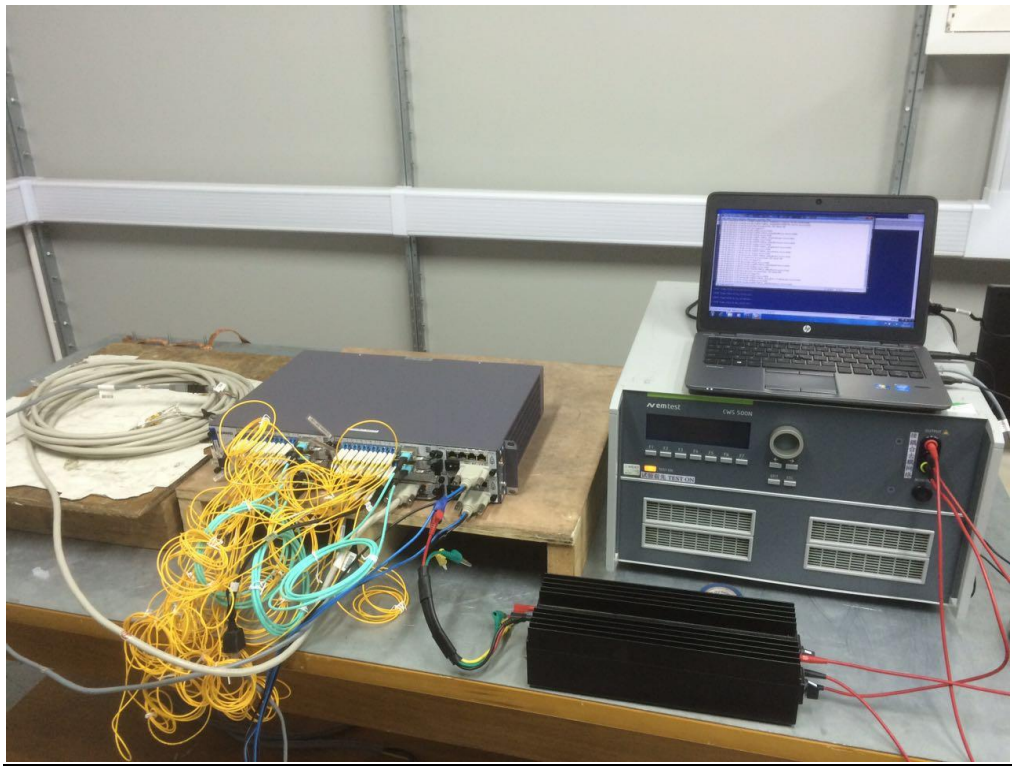

Immunity to Immunity to Common Mode Conducted Disturbances of 0 Hz to 150 kHz of DC port

Immunity to Immunity to Common Mode Conducted Disturbances of 0 Hz to 150 kHz of signal port

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Immunity to voltage dips, short interruption and voltage variation of DC power port

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Appendix: Abbreviation

Table 36 Abbreviation

Abbreviation	Full Name
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Electromagnetic Susceptibility
ESD	Electrostatic Discharge
EUT	Equipment Under Test
AE	Auxiliary Equipment
AC	Alternating Current
DC	Direct Current
NSA	Normalized Site Attenuation
S_{VSWR}	Site Voltage Standing Wave Ratio
LISN	Line Impedance Stabilization Network
ISN	Impedance Stabilization Network
CDN	Coupling and Decoupling Network
TC	Test Configuration
NT	Not Test
N/A	Not Applicable
RMS	Root Mean Square

END

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